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Shallow water hermit crabs of the families Pylochelidae, Diogenidae and Paguridae (Crustacea: Decapoda: Anomura) from the Sea of Japan, with a description of a new species of *Diogenes*

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日本海浅海域産ヤドカリ類（甲殻亜門：十脚目：異尾亜目：ツノガイヤドカリ科、
ヤドカリ科, ホンヤドカリ科）およびツノヤドカリ属の1新種の記載

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ABSTRACT

In collections of hermit crabs from intertidal and shallow areas of the Sea of Japan, 54 species belonging to three families and 19 genera were found, with a new species of *Diogenes*. These specimens are mainly from the collection of the Toyama Science Museum and from personal collection by Hiroshi Motoh of the Kyoto Sea Farming Center supplemented by specimens in the collections of several other museums and institutions. This hermit crab fauna was primarily composed of species endemic to temperate Japanese and its adjacent waters; however several were widely distributed in Indo-west Pacific regions, and a few in northern Pacific areas.

Key words: hermit crab, Pylochelidae, Diogenidae, Paguridae, Sea of Japan, Toyama, Wakasa Bay, Tsushima Strait, Korea, Russia

和文要旨

これまで日本海の潮間帯および浅海域から採集されたヤドカリ類を調べ、3科19属54種を同定した。この中には、1種の新種のツノヤドカリ（イザナミツノヤドカリ）が含まれる。これらの標本は主として富山市科学文化センターの所蔵標本、および京都府栽培漁業センターの本尾洋氏のコレクションによるもので、これにさらに国内外のいくつかの博物館の所蔵標本も調べたものである。これらのヤドカリ類の大部分は日本およびその近隣の温帶域に分布する種であるが、少数のインド一西太平洋に分布する種、および北太平洋に広く分布する種を含む。

キーワード：ヤドカリ, ツノガイヤドカリ科, ヤドカリ科, ホンヤドカリ科, 日本海,
富山, 若狭湾, 対馬海峡, 韓国, ロシア

INTRODUCTION

The Sea of Japan is located between the Japanese Archipelago and Asian Continent. Because of its position in the Far East and because of its closeness, the Sea of Japan is of considerable zoogeographocal interest (e.g., Nishimura, 1965-1969). However, faunal information on marine invertebrates about the area is, to say the least, sparse. As far as hermit crab fauna is concerned, the existing literature provided only scattered records (Kikuchi, 1932, 1959; Miyake et al., 1962; Miyake, 1978, 1982; Honma and Kitami, 1978; Komai et al., 2002).

Recently, I examined specimens of hermit crabs housed in the Toyama Science Museum (TOYA) collected from Toyama Bay through the courtesy of Dr. Noboru Nunomura and a collection of hermit crabs made by Dr. Hiroshi Motoh of the Kyoto Sea Farming Center from Wakasa Bay through the courtesy of HM. Both of them represent the foundation of this report. The Motoh's collection was a part of the collection of decapod anomurans including the Lithodidae, Galatheidae, Porcellanidae and Albunidae, and the report based on these all anomurans will be published in Motoh (in press). This material has been supplemented by collections in the following museums or institutions;

Noto Marine Center, Ishikawa (NMCI)(= Noto Kaiyo Fureai Center, Noto-machi, Ishikawa-ken)

Osaka Museum of Natural History (OMNH)

Yamagata Prefectural Museum (YPM-SS)

Sado Marine Biological Station, Faculty of Science, Niigata University
(SMBL-NU)

The Museum of Yamagata University (MYU)

Natural History Museum and Institute, Chiba (CBM-ZC)

National Science Museum, Showa Memorial Institute, Tsukuba (NSMT-Cr R)

Kitakyushu Museum of Natural Historuy (ZLKU (KMNH))

Department of Geology, Kyushu University (DGKU)

National Museum of Natural History, Smithsonian Institution (USNM)

For a description of a new species of *Diogenes*, material housed in the following museums were examined for comparative purpose;

Muséum national d'Histoire naturelle, Paris (MNHN)

Western Australian Museum (WAM)

Museum of Zoology, Cambridge University (MZCU)

Australian Museum (AM)

These materials includes three families and 19 genera, which are reported here.

MATERIAL AND METHODS

Here, the Sea of Japan is defined as area surrounded by the Asia Continent, the Korean Peninsula, the Japanese Archipelago, and Sakhalin, with its northern boundary Mamiya (Tatar) Strait (=area between east coast of Russia and Sakhalin Island) and southern boundary Tsushima Strait (= area between Korean Peninsula and Kyushu) (Fig. 1). Area of the Sea of Japan is 978,000 km² and the mean depth is 1753 m with the maximum depth 3742 m. A cold ocean current, Liman Current, flow in its northern part, and a warm ocean current, Tsushima Current, flows in its southern part. Toyama Bay (Toyama-wan in Japanese) is the area formed with its boundaries of southern coast of Toyama-ken and eastern coast of Noto Peninsula (Ishikawa-ken). Wakasa Bay (Wakasa-wan in Japanese) is formed by coastal lines of Fukui-ken and Kyoto-fu (Fig. 2).

All of TOYA specimens have been returned to the Toyama Science Museum, and the specimens from Wakasa Bay have been deposited in CBM.

One measurement, shield length (SL), as measured from the tip of the rostrum or midpoint of the rounded rostral lobe to the posterior midpoint of the cephalothoracic shield, provides an indication of animal size. Other abbreviations are; coll., collector; NoNu, Noboru Nunomura.

For each species, the synonymies include only original descriptions, illustrated systematic accounts, or references to pertinent to the species in the region. Localities of previous as well as present collection records from the Sea of Japan are also provided.

In the specimen data, "-ken" and "-shi" mean Prefecture and City, respectively (e.g., "Toyama-shi, Toyama-ken" equal "Toyama City, Toyama Prefecture"). Toyama-shi, Himi-shi, Takaoka-shi and Shinminato-shi all belong to Toyama-ken. "Korea" means both/either Republic of Korea and/or Democratic People's Republic of Korea. Korea Strait is a region between the Korean Peninsula and Tsushima Islands in the Tsushima Strait.

One notice is about recent Sakai and Fukushima's (1998) record of a single specimen of a tropical Indo-Pacific water species, *Calcinus morganii* Rahayu and Forest, 1999 (as *Calcinus gaimardi*, not *Calcinus gaimardii* (H. Milne Edwards, 1848)), from Nanao Bay, Noto Peninsula (Ishikawa-ken), Sea of Japan. This is no doubt an intentional introduction, because it was found in a tropical water shell (*Trochus maculatus*), which has never been found in the Sea of Japan. Further, intertidal areas, its habitat, in that coast often suffer low temperature to nearly 0°C and often experience snow falling, to which this species never tolerate. Perhaps, it was kept as a pet animal and escaped or intentionally released.

SYSTEMATICS

Family Pylochelidae Bate, 1888

Pomatocheles jeffreysii Miers, 1879

Figs. 3, 4

Pomatocheles jeffreysii Miers, 1879: 49, pl. 3, fig. 2, 2a-d. - Terao, 1913: 390. - Kikuchi, 1932: 8. - Miyake, 1960: 47, 94, pl. 47, fig. 7. - Miyake et al., 1962: 125. - Miyake, 1975: 270, pl. 112, fig. 1. - Miyake, 1978: 4, text-fig. 1. - Miyake & Imafuku, 1980: 1. - Miyake, 1982: 95, pl. 32, fig. 1. - Forest, 1987: 119, figs. 4a, 5c, d, 7c, 32a-i, 33a-h, 34a-d, 35a-d; pls. 1.

Mixtopagurus jeffreysii - Balss, 1913: 35, text-fig. 25, pl. 1, fig. 10, pl. 2, fig. 1. - Yokoya, 1933: 71. - Makarov, 1962: 115, fig. 42.

Material Examined

1♂, SL = 1.70 mm, off Amio-cho, Yosano-gun, Kyoto-fu, Aug. 1982, coll. Genji Kanemaru, OMNH Ar 2808 (Z82-53); 1 exs. (dried specimen, not measured due to damage), Nezugaseki, Shonaihama, Yamagata-ken, 1966, YPM-SS 0342, A-19.

Records from the Sea of Japan: Tsuyazaki (Fukuoka-ken), Tottori-ken, Nagato (Yamaguchi-ken), Toyama Bay, Korea (Kikuchi, 1932; Miyake et al, 1962; Miyake, 1978; Forest, 1987), and now Kyoto-fu and Yamagata-ken.

Distribution: From Kyushu northward to Sagami Bay (Pacific coast) or to Toyama Bay (Sea of Japan coast); Cheju, Korea.

Family Diogenidae Ortmann, 1892

***Aniculus miyakei* Forest, 1984**

Pagurus aniculus - de Haan, 1849: 209. [Not *Pagurus aniculus* (Fabricius, 1787)]

Aniculus typicus - Ortmann, 1892: 289.- Stimpson, 1858: 247 (85). - Stimpson, 1907: 207. [Not *Aniculus typicus* Dana, 1852]

Aniculus aniculus - Balss, 1913: 49. - Kikuchi, 1932: 8. - Yokoya, 1933: 79. - Utinomi, 1956: 32, fig. 6. - Miyake et al., 1962: 125. - Miyake, 1965: 640, fig. 1067. - Suzuki, 1971: 93, pl. 32, fig. 4. - Miyake, 1975: 112, fig. - Miyake, 1978: 16, text-fig. 6. - Miyake, 1982: 98, pl. 33, fig. 5. [Not *Aniculus aniculus* (Fabricius, 1787)]

Aniculus miyakei Forest, 1984: 36, figs. 10, 18, 37-40. - Miyake, 1998: 98, pl. 33, fig. 5. - Yamaguchi & Baba, 1993: 268, figs. 68A, 68B.

Not *Aniculus aniculus* - Honma and Kitami, 1978: 43 (in part). [= *Pagurus rubrior* Komai, 2003]

Remarks: I reexamined one of the specimens reported as *Aniculus aniculus* from the Sado Island, Niigata-ken, by Honma and Kitami (1978) and found it is actually *Pagurus rubrior*.

Records from the Sea of Japan: Niigata-ken, Toyama-ken, Tottori-ken (Kikuchi, 1932; Miyake et al., 1962; Miyake, 1978).

Distribution: Kyushu northward to the Boso Peninsula (Pacific coast) or to Niigata-ken (Sea of Japan coast).

***Clibanarius infraspinatus* Hilgendorf, 1869**

Figs. 5, 6

Material Examined

1♀, SL = 11.60 mm, Ukawa, Toyama-ken, 3 Oct. 1981, coll. Toyama Pref. Fish Res. Center, TOYA Z81-16; 1♀, SL = 13.15 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-a; 1♂, SL = 7.95 mm, Amaharashi, Takaoka-shi, 2 Oct. 1981, coll. NoNu, TOYA Z81-52-c; 1♀, SL = 11.45 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-f; 1♀, SL = 7.90 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-g; 1♂, SL = 11.40 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-h; 1♀, SL = 7.90 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-i; 1♀, SL = 9.10 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-j; 1♀, SL = 11.20 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-k; 1♂, SL = 8.35 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-l; 1♂, SL = 11.50 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-m; 1♀, SL = 10.55 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-n; 1♀, SL = 8.50 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-p; 1♂, SL = 12.20 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-q; 1♂, SL = 12.00 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-r; 1♀, SL = 3.30 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-s; 1♂, SL = 5.35 mm, Amaharashi, Takaoka-shi, 28 May 1982, coll. NoNu, TOYA Z82-16; 4♂, SL = 18.75-20.70 mm, Toyama Bay, 15 Dec. 1983, coll. Hisao Nambu, TOYA Z83-97-b; 1♂, SL = 3.35 mm, Konoura, Notozima-machi, Ishikawa-ken, 29 June 1984, coll. NoNu, TOYA Z84-21-a; 1♂, SL = 3.5 mm, Konoura, Notozima-machi, Ishikawa-ken, 29 June 1984, coll. NoNu, TOYA Z84-21-b; 2♂, SL = 2.80-3.30 mm, Konoura, Notozima-machi, Ishikawa-ken, 29 June 1984, coll. NoNu, TOYA Z84-21-c; 2♂, SL = 4.50-6.20 mm, Yoshitsuna-iwa, Amaharashi, Takaoka-shi, 24 July 1987, coll. NoNu, TOYA Z87-17-a; 5♂, SL = 12.00-16.65 mm, Kuzuba, Himi-shi(?), 22 Sept. 1991, coll. Nozomu Miyamoto, TOYA Z91-40; 1♂, SL = 10.10 mm, Amaharashi, Takaoka-shi, 21 Sept. 1971, coll. NoNu, TOYA AA-01; 1♀, SL = 10.5, Amaharashi, Takaoka-shi, 29 June

1978, coll. NoNu, TOYA AA-03; 2♂, SL = 10.70-16.20 mm, Toyama Bay, TOYA AA-05; 2♂, SL = 15.15-18.65 mm, Amaharashi, Takaoka-shi, 12 Aug. 1977, coll. NoNu, TOYA AA-06; 1♀, SL = 8.50 mm, Ao, Himi-shi, 17 Aug. 1979, coll. Toyama Fish. St., TOYA Z80-189-a; 1♂, SL = 4.90 mm, Amaharashi, Takaoka-shi, 2 Aug. 1990, coll. Hisao Nambu, TOYA Z90-34-b.

Remarks: Miyake et al. (1962) and Miyake (1978) recorded *Clibanarius striolatus* from the Toyama Bay and the Sagami Bay respectively, the latter of which was on the basis of the specimens collected by trawl nets for shrimps or prawns. However, *C. striolatus* is a tropical water species who inhabits intertidal areas of sand or mud flats in estuaries. *Clibanarius striolatus* and *C. infraspinatus* share many morphological characters including distinct stripes on the ambulatory pereopods. It is no doubt that the records by Miyake et al. (1962) and Miyake (1978) are incorrect and they actually reported the latter species.

Record from the Sea of Japan: Now Toyama Bay.

Distribution: Taiwan, Philippines, Vietnam, Singapore, Indonesia, Australia, Red Sea, Indian Ocean; Tosa Bay, Hyuganada, Tokyo Bay (Miyake, 1982; Asakura unpubl.), and now Toyama Bay.

Clibanarius virescens (Krauss, 1843)

Pagurus virescens Krauss, 1843: 56, table 4, fig. 3.

Clibanarius virescens - Miyake, 1956: 315, figs. 8, 9. - Miyake, 1978: 49 (key), 50, pl. 3, figs. 3, 4. - Miyake & Imafuku, 1980: 4. - Miyake, 1982: 101, pl. 34, fig. 2. - Rahayu & Forest, 1993: 772.

Clibanarius bimaculatus - Ortmann, 1892: 291. - Balss, 1913: 41, fig. 28. - Miyake et al., 1962. - Miyake, 1965: 641, fig. 1068. - Miyake, 1975: 200, pl. 112, fig. 6.

Records from the Sea of Japan: Tsuyazaki (Fukuoka-ken)(Miyake et al., 1962).

Distribution: Indo-West Pacific from east coast of Africa to Fiji, in Japan, northward to Boso Peninsula (Pacific coast) or Tsuyazaki (Sea of Japan coast).

Diogenes edwardsii (De Haan, 1849)

Figs. 7, 8

Pagurus Edwardsii De Haan, 1849: 211, pl. 50, fig. 1.

Diogenes edwardsii - Stimpson, 1858: 246. - Stimpson, 1907: 202, pl. 24, fig. 1. - Ortmann, 1892: 295 - Rathbun, 1902: 36. - Balss, 1913: 44. - Terao, 1913: 362. - Terao, 1914: 245, text-figs. A-C. - Yokoya 1933: 77. - Kim, 1973: 206, text-fig. 39, pl. 67, fig. 21. - Miyake, 1975: 113, 276. - Miyake, 1978: 24. - Miyake & Imafuku, 1980: 2. - Miyake, 1982: 107, pl. 36, fig. 1.- Yamaguchi & Baba, 1993: 270, fig. 69.

Material Examined

1♂, SL = 8.60 mm, Yokata Fishery Harbor, Toyama-shi, 18 Sept. 1978, coll. Hisao Nambu, TOYA Z78-69; 1♂, SL = 3.85 mm, Amaharashi, Toyama-shi, 18 Apr. 1978, coll. NoNu, TOYA Z78-7; 1♀, SL = 6.70 mm, Kurosaki, Nanao-shi, Ishikawa-ken, 11 Sept. 1979, coll. NoNu, TOYA Z79-85-a; 2♂, SL = 7.10-7.50 mm, Kurosaki, Nanao-shi, Ishikawa-ken, 11 Sept. 1979, coll. NoNu, TOYA Z79-85-b; 1♀, SL = 8.50 mm, Hime-shi, 17 Aug. 1979, coll. Toyama Pref. Fish Res. Center, TOYA Z80-189-a; 2♂, SL = 8.35-9.00 mm, Yokata, Toyama-shi, 30 Sept. 1987, coll. Hisayoshi Kuroda, TOYA AA-04; 1♀, SL = 8.00 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-o; 1♂, SL = 9.80 mm, Otaki, Hime-shi, 6 June 1982, coll. NoNu, TOYA Z82-19-a; 1♂, SL = 6.35 mm, Otaki, Hime-shi, 6 June

1982, coll. NoNu, TOYA Z82-19-b; 1♀, SL = 4.55 mm, Otaki, Himi-shi, 6 June 1982, coll. NoNu, TOYA Z82-19-c; 1♂, SL = 18.75 mm, Oozakai, Himi-shi, 21 Aug. 1982, coll. NoNu, TOYA Z82-37; 1♂, SL = 7.80 mm, Yokata Fishery Harbor, Toyama-shi, 21 Dec. 1983, coll. Hisao Nambu, TOYA Z83-100; 6♂, SL = 9.90-11.15 mm, 1♀, SL = 8.20 mm, Amaharashi, Takaoka-shi, 22 July 1983, coll. NoNu, TOYA Z83-48-a; 2♂, SL = 10.10-10.50 mm, 1♀, SL = 10.00 mm, Amaharashi, Takaoka-shi, 22 July, 1983, coll. NoNu, TOYA Z83-48-b; 1♀, SL = 9.90 mm, Yokata Fishery Harbor, Toyama-shi, 5 Dec. 1983, coll. Hisao Nambu, TOYA Z83-97-a; 2♂, SL = 6.35-8.80 mm, off Iwase, Toyama-shi, 17 June 1990, coll. Nozomu Miyamoto, TOYA Z90-23-a; 2♂, SL = 9.95-10.10 mm, off Iwase, Toyama-shi, 17 June 1990, coll. Nozomu Miyamoto, TOYA Z90-23-b; SL = 10.50 mm, 3♀, SL = 5.50-8.15 mm, off Iwase, Toyama-shi, 17 June 1990, coll. Nozomu Miyamoto, TOYA Z90-23-c; 1♂, SL = 9.35 mm, 1♀, SL = 8.65 mm, off Iwase, Toyama-shi, 23 June 1990, coll. Nozomu Miyamoto, TOYA Z90-28-a; 1♂, SL = 8.05 mm, 1♀, SL = 5.75 mm, Mizuhashi Fishery Harbor, Toyama-shi, 2 July 1985, coll. Hisao Nambu, TOYA Z85-18; 1♂, SL = 6.40 mm, Yokata Fishery Harbor, Toyama-shi, 25 July 1987, coll. Hisayoshi Kuroda, TOYA Z87-18-a; 1♂, SL = 9.90 mm, Yokata Fishery Harbor, Toyama-shi, 25 July 1987, coll. Hisayoshi Kuroda, TOYA Z87-18-b; 1♂, SL = 3.10 mm, Koshinoe, Shinminato-shi, 14 Sept. 1987, coll. Shingo Nunomura, TOYA Z87-28; 2♂, SL = 5.95-6.40 mm, 1♀, SL = 4.10 mm, Toyama Bay, 25 Mar. 1988, coll. NoNu, TOYA Z88-1; 7♂, SL = 4.00-6.60 mm, 1 ov. ♀, SL = 5.50 mm, Namerikawa, Iwase, 28 Sept. 1988, coll. Toyama Pref. Fish Res. Center, TOYA Z88-28-a; 12♂, SL = 5.00-10.50 mm, 9♀, 5.15-8.85 mm, off Iwase, Toyama-shi, 7 June 1990, coll. Nozomu Miyamoto, TOYA Z90-19-a; 2♂, SL = 10.70 - 11.30 mm, 1 ov. ♀, SL = 6.15 mm, Odajyukuno, Miyazu-shi, Kyoto-fu, Wakasa Bay, summer 2003, coll. H. Motoh (No. 8), gill net, CBM-ZC 8453.

Records from the Sea of Japan: Tsuyazaki (Fukuoka-ken), Tottori-ken, Niigata-ken, Yamagata-ken (Miyake et al., 1962; Miyake, 1978), and now Toyama Bay; Korea Strait and southeastern Korea (Kim, 1973).

Distribution: Kyushu northward to Onagawa Bay (Miyagi-ken, Pacific coast) or Yamagata-ken (Sea of Japan coast); Korea.

Diogenes nitidimanus Terao, 1913

Figs. 9, 10

Diogenes nitidimanus Terao, 1913: 363, text-fig. 1. - Kim, 1973: 208, text-fig. 40, pl. 68, fig. 22. - Miyake & Imafuku, 1980: 3, pl. 1, fig. 5.

Diogenes edwardsi [sic.] - Shimoyama, 1979: 65. [Not *Diogenes edwardsii* (De Haan 1849)]

Diogenes spinifrons - Komai, et al., 1992: 196. [Not *Diogenes spinifrons* (De Haan, 1849)]

Material Examined

3♂, 4.60-5.30 mm, Vostok Bay, Peter the Great Bay, Russia, 2003, through courtesy of Tohru Takahashi, CBM-ZC 8381. Numerous material, intertidal, sand flat, Tsuyazaki, Fukuoka-ken, coll. S. Shimoyama, summer 1978 and summer 1979, DGKU.

Remarks: I reexamined the specimens identified as *D. edwardsii* by Shimoyama (1979) collected from Tsuyazaki and found they are *D. nitidimanus*.

Record from the Sea of Japan: Tsuyazaki (Fukuoka-ken)(Shimoyama, 1979); southeast Korea (Kim, 1973) and now northeast coast of Russia.

Distribution: Kyushu northward to Hakodate Bay or Tsuyazaki (Fukuoka-ken); Korea; northeast coast of Russia.

***Diogenes penicillatus* Stimpson, 1858**

Figs. 11, 12

Diogenes penicillatus Stimpson, 1858: 84. - Alcock, 1905a: 165. - Stimpson, 1907: 203. - Balss, 1913: 44 - Terao, 1913: 364. - Yokoya, 1933: 77. - Miyake & Imafuku, 1980: 3, pl. 1, fig. 8. - Miyake, 1982: 107, pl. 36, fig. 2.

Material Examined

3♂, 5.40-5.60 mm, off Iwase, Toyama-shi, 7 June 1990, coll. Nozomu Miyamoto, TOYA Z90-19-b; 1♂, SL = 6.05 mm, off Iwase, Toyama-shi, 23 June 1990, coll. Nozomu Miyamoto, TOYA Z90-28-b.

Records from the Sea of Japan: Off Kamo (Yamagata-ken), Ussuri Bay, Russia (Miyake et al, 1962; Miyake, 1982), and now Toyama Bay.

Distribution: Kyushu northward to Sendai Bay (Pacific coast) or Yamagata-ken (Sea of Japan coast); Ussuri Bay, Russia.

***Diogenes spinifrons* (De Haan, 1849)**

Figs. 13, 14

Pagurus spinifrons De Haan, 1849: 212, pl. 49, fig. 6

Diogenes sp. 2 - Miyake & Imafuku, 1980: 3, pl. 1, fig. 6

Diogenes spinifrons - Stimpson, 1858: 74. - Alcock, 1905a: 165. - Balss, 1913: 44. - Terao, 1913: 364. - Miyake & Imafuku, 1981: 16. - Miyake, 1982: 104, pl. 35, fig. 4.

Not *Diogenes spinifrons* - Komai, et al., 1992: 196. [= *Diogenes nitidimanus* Terao, 1913].

Material Examined

2♂, 5.90-6.60 mm, off Kuroi, Jyoetsu-shi, Niigata-ken, 8 June 1991, coll. Yukihiro Nakamura, CBM-ZC 8382.

Records from the Sea of Japan: Yamagata-ken (Miyake, 1982) and now Niigata-ken.

Distribution: Kyushu northward to Sagami Bay (Pacific coast) or to Yamagata-ken (Sea of Japan coast).

***Diogenes izanamiae*, new species**

Figs. 15-18

Diogenes senex - Yajima & Yamaguchi, 1983: 1. - Matada et al., 1995: 36. - Tatsu, 2002: 43. [Not *Diogenes senex* Heller, 1865]

Material Examined

Type material: holotype: ♂, SL = 2.45 mm, Tsukumo Bay, Noto Peninsula, Ishikawa-ken, 3 Aug. 1979, coll. Yamaguchi, Rem. Z80-02, OMNH Ar 2137. Paratypes: 3♂, SL = 1.50-1.85 mm, 1 ov. ♀ (allotype), SL = 2.25 mm, Ossaka, Uchiura-cho, Housu-gun, Noto Peninsula, Ishikawa-ken, NMCI-AR-154 (I-40-284); 2♀, SL = 1.95-2.75 mm, 3 ov. ♀, SL = 2.05-2.10 mm, 4♂, SL = 1.95-2.95 mm, data same as NMCI-AR-154, NMCI-AR-162 (I-40-303); 1♂, SL = 1.70 mm, data same as holotype, OMNH Ar 2138.

Comparative material examined: *Diogenes pallescens* Whitelegge, 1897: syntypes, 3♂, 4♀, SL = 1.80-2.60 mm, Funafuti, Ellice Islands, coll. G. Hedley, AM G1402; 1♂, SL = 2.30 mm, Baie de Cauda, Vietnam, coll. R. Sérène, 11

Sept. 1953, Rte 1379, MNHN Pg 1502 (= lectotype of *Diogenes serenei* Forest, 1956); 2♂, SL = 1.70-1.80 mm, Mahlos, Maldives, coll. S. Gardiner, MZCU (= syntypes of *Diogenes gardineri* Alcock, 1905). *Diogenes leptocerus* Forest, 1956: syntype, 1♂, SL = 2.00 mm, Emboucheere due Cuobe, Vietnam, 14 Apr. 1954, Rte 1448, MNHN Pg 1416. *Diogenes tumidus* Rahayu and Forest, 1995: holotype, ♂, SL = 2.40 mm, Sorong, Irian, (= New Guinea), Indonesia, MNHN Pg 5061; 6♂, SL = 1.40-2.25 mm, 3♀, SL = 1.35-1.40 mm, Indonesia, Oct 1991, MNHN Pg. 5085. *Diogenes spinicarpus* Rahayu and Forest, 1995: holotype, ♂, SL = 1.80 mm, Tanjung Tiram, Amboine, Indonesia, MNHN Pg 5071; paratype, 1♀, SL = 1.80 mm, Tanjung Tiram, Amboine, Indonesia, MNHN Pg. 5072; 1♂, SL = 2.00 mm, Marsegu, Cerum, Indonesia, 16 Sept. 1993, MNHN Pg. *Diogenes biramus* Morgan, 1987: holotype, ♂, SL = 3.10 mm, 4 m, Coral Bay near headland, Port Essington, Northern Territory, Australia, 12 Aug. 1986, WAM156-87; 1♀, SL = 2.5 mm, 4-12 m, Beagle Reef, Kimberleys, Australia, UMB 91#35, coll. Gary J. Morgan, 24 Aug. 1991, WAM 173.91. *Diogenes capricorneus* Grant and McCulloch, 1906: holotype, ♀, SL = 2.50 mm, Coral sand, Masthead Island, Queensland, Australia, 23°32'S, 151°44'E, coll. F. E. Grant, 1904, AM G5626.

Description

Shield (Fig. 15A, B) 1.0-1.2 times longer than wide; anterior margin between rostral process and lateral projections straight to slightly concave; anterior margins armed laterally with sharp or blunt spines or tubercles; lateral margins gently convex, often armed with few small spines or tubercles. Lateral projections obsolete. Intercalary rostral process simple, slightly shorter to slightly longer than ocular acicles.

Ocular peduncles (Fig. 15A) only very slightly swollen proximally; corneas not dilated or only slightly dilated. Ocular acicles with distal margins strongly oblique, armed with 3-5 spines.

Antennule peduncles (Fig. 15A) overreaching ocular peduncles by 0.2-0.5 length of ultimate segments; ultimate and penultimate segments unarmed.

Antennal peduncles (Fig. 15A, C) with fifth segment reaching only 0.5-0.7 length of ocular peduncles; fifth segment unarmed; fourth segment with strong subdistal spine on dorsal face; third segment protruded ventrodistally; second segment with dorsodistal lateral angle bearing strong spine, dorsodistal mesial angle with spine. Antennal acicle terminating in sharp spine; mesial margin with 1 or 2 sharp spines; lateral margin with 1-3 spines.

Third maxillipeds (Fig. 15D) with ischium without crista dentata, but with one very small spine (tooth) and row of very short, stiff setae along ventromesial margin; dactyl, propodus, carpus and merus unarmed.

Left cheliped (male, Fig. 16A-C; female, Fig. 16D, E) moderately setose; more ovate and armature stronger in females and smaller individuals of both sexes than in large males. Dactyl with upper face and upper portion of outer face armed with tubercles (large males) or upper face armed with 1 or 2 rows of spines and outer face with 1-3 irregular rows of spines (females and smaller individuals of both sexes). Palm with upper and outer faces armed with tubercles or blunt spines and lower face with numerous tubercles or blunt spine mainly distally (large males), or upper face armed with 1 or 2 rows of strong spines, outer face with scattered or numerous spines, and lower face armed with spines (females and smaller individuals of both sexes). Carpus with upper margin armed with row of spines and outer face with scattered spines or tubercles. Merus with ventrolateral margin bearing row of spines and ventromesial margin sometimes with few spines or tubercles.

Right cheliped (Fig. 17A-D) setose. Dactyl and fixed finger "duck-beak" like shape; distal margins rounded and armed with numerous sharp corneous spines (= corneous teeth on cutting edge), outer surface of fixed finger sometimes with few tubercles; carpus with 2 sharp and strong spines along distal margin of outer face; merus and ischium unarmed.

Second (Fig. 17E-H) and third (Fig. 18A-C) pereopods generally similar, third slightly longer and slightly slenderer than second; moderately setose, most of setae on dactyls and propodi simple. Dactyls 1.0-1.1 length of propodi, each terminating in strong half-transparent claw. Propodi 1.4-1.6 length of carpi, unarmed. Carpi 0.7-0.8 length of meri;

each with dorsodistal spine and, on second, additional spine in front of proximal margin of dorsal face.

Anterior lobe of sternite of third pereopods (Fig. 15E) with two protrusions bearing setae.

Fourth pereopods (Fig. 18D) with well-developed propodal rasp. Fifth pereopods chelate.

Telson (Fig. 15F) with small median cleft; terminal margins with row of tiny spines, terminal and lateral margins often armed with few strong spines.

Etymology: From the name of the primal female God in the Japanese mythology such as Koziki and Nihonshoki, *Izanami*, literally she-who-invites. There are several Shinto shrines dedicated to *Izanami* in Shimane-ken along the coast of the Sea of Japan.

Remarks: Among the species of the genus *Diogenes*, there is a small group of the species in which the antennal peduncles are slender and shorter than the ocular peduncles and the antennal flagella lack a pair of long setae for filter feeding (e.g., Haig and Ball, 1988). This group includes *D. pallescens*, Whitelegge, 1897, *D. leptocerus* Forest, 1956, *D. biramus* Morgan, 1987, *D. capricorneus* Grant and McCulloch, 1906, *D. viridis* Haig and Ball, 1988, *D. spinicarpus* Rahayu and Forest, 1995, and *D. tumidus* Rahayu and Forest, 1995. *Diogenes gardineri* Alcock, 1905b, and *D. serenei*, Forest, 1956, were once included in this group. However, McLaughlin (2002b) found that *D. pallescens*, *D. gardineri* and *D. serenei* were conspecific; *Diogenes pallescens* is the senior synonym. *Diogenes senex* was also once included in this group, for example, by Haig and Ball (1988). However, McLaughlin and Haig (1996) demonstrated that it was only because the species had been misinterpreted; true *D. senex* had well developed antennal flagella which articles each had a pair of long setae.

This new species was incorrectly identified as *Diogenes senex* and reported from the Noto Peninsula (see synonomies above). However, this species apparently was not *D. senex* in having the slender antennal peduncles shorter than the ocular peduncles and the antennal flagella lacking a pair of long setae, and by these characters, this species is quite similar to *D. pallescens* and other related six species mentioned above.

This species is very characteristic in having the "duck-beak" like dactyl and fixed finger of the left cheliped, which are armed distally with numerous very sharp spines. Among the species of *D. pallescens* and other related taxa mentioned above, this character is shared only by another species *D. tumidus*, known from Indonesia and Singapore, tropical west Pacific, inhabiting intertidal rock pools (Rahayu and Forest, 1995; Rahayu, 1996). Morphologically, these two species are quite similar. However, the two species is easily separated, as *D. tumidus* has very dense plumose setae on the carapace, the chelipeds, and ambulatory pereopods obscuring any armatures, which are mostly lacking in the new species. However, setation is sometimes subject to variation in hermit crabs, and density of plumose setae on the chelipeds, shield and ambulatory dactyls of this species also exhibit some variations. But, al least among the specimens that I examined, this character is not overlapped between the two species.

Distribution: Known only from coasts of the Noto Peninsula, Sea of Japan.

Habitat and ecology: Yajima and Yamaguchi (1983) quantitatively investigated spatial distribution, abundance, and shell utilization of intertidal hermit crabs in Tsukumo Bay, Noto Peninsula, Ishikawa-ken. They found that this species was most abundant (568 individuals, 42.9% among the hermit crab individuals collected), followed by *Pagurus filiholi* (337 ind., 25.4%), *Pagurus minutus* (221 ind., 16.7%), *Paguristes ortmanni* (135 ind., 10.2%), and *Pagurus lamuginosus* (58 ind., 4.4%). This species was found under pebbles in intertidal zones of rocky shores or pebble beaches, mostly between MLW (mean water level) and ELWS (extreme low water of spring tide), or few were found in zones lower than those level until -50 cm under the datum level. Shell species used by this species were *Batillaria multiformis*, *Cerithium kobelti* and *Littorina brevisula*.

Paguristes digitalis Stimpson, 1858

Figs. 19, 20

Paguristes digitalis Stimpson, 1858: 247. - Stimpson, 1907: 212, pl. 25, fig. 1. - Balss, 1913: 37, figs. 26, 27. - Terao, 1913: 374. - Yokoya, 1933: 73 - Yokoya, 1939: 280. - Kamita, 1955: 30, text-fig. 10. - Yamaguchi & Yamada, 1955: 132. - Miyake, 1961a: 11. - Miyake et al, 1962: 125. - Miyake, 1965: 640, fig. 1066. - Igarashi, 1970: 3, pl. 2, fig. 4. - Miyake, 1978: 26 (key), 29, text-fig. 9. - Miyake, 1982: 97, pl. 33, fig. 2. - Komai et al., 1992: 196.

Paguristes kagoshimensis Ortmann, 1892: 281, pl. 12, fig. 8.

Material Examined

1♂, SL = 13.15 mm, Fukura, off Nishihama, Yamagata-ken, 9 June 1975, YPM-SS 1749, A-19.

Remarks: Miyake et al.(1962) recorded four species of *Paguristes* from the Sea of Japan, viz., *P. kagoshimensis* Ortmann, 1892, from Tsuyazaki and Toyama, *P. ortmanni* Miyake, 1978 (as *P. barbatus* Heller, 1862) from Tsuyazaki, Tottori-ken and Yamagata-ken, *P. digitalis* from Tottori-ken, and *P. japonicus* from Tsuyazaki and Tottori-ken.

However, it was found by a recent Komai's (2001) revisional study on *Paguristes* that the type material of *P. kagoshimensis* was conspecific with *P. digitalis*, viz., *P. kagoshimensis* was a junior subjective synonymy of *P. digitalis*. He provided a new name *P. versus* Komai, 2001, to the specimens of the species (other than the type of *P. kagoshimensis*) heretofore assigned to *P. kagoshimensis*. Komai (2001) also revealed that one male and one female among the specimens reported as *P. kagoshimensis* by Miyake (1978) were actually *P. palythophilus* Ortmann, 1892, and *P. acanthomerus* Ortmann, 1892, respectively. He further disclosed that the photographs of *P. kagoshimensis* in Baba (1986) and Yu and Foo (1990) were neither *P. palythophilus*, *P. acanthomerus* nor *P. versus*. So, he described a new species, *P. albimaculatus* Komai, 2001, for this taxon.

As a result, at least four species are confounded under the name of *P. kagoshimensis*. Thus, Miyake et al.'s (1962) record of *P. kagoshimensis* (now *P. versus*) from the Sea of Japan is very suspicious. Komai (2001) did not include Miyake et al.'s (1962) record of this species from the Sea of Japan into the synonymies under *P. versus*, when he described it as new. This is most probably because he could not locate the specimens used by Miyake et al. (1962), which means that he could not evaluate precisely species identities of this record. In this paper too, the record of *P. kagoshimensis* (now *P. versus*) in the region is excluded according to Komai (2001).

Similar problem occurred on the record of *Paguristes setosus* (H. Milne Edwards, 1848) from the Sea of Japan. According to Yokoya (1933) and Miyake (1978), this species was distributed in the Sea of Japan coasts and Sea of Genkai (southern boundary of the Sea of Japan). However, Forest and McLaughlin (1998) found that the Japanese species assigned to *P. setosus* was actually a different taxon and described it as *Paguristes miyakei* Forest and McLaughlin, 1998. They stated "it is not possible to ascertain the identities of the specimens reported by Yokoya (1933) from several Japanese localities" so that they restricted the geographical distribution of *P. miyakei* to Sagami Bay. Accordingly, in this paper too, the record of *P. miyakei* in the Sea of Japan is excluded.

Records from the Sea of Japan: Tottori-ken (Miyake et al., 1962), Oshoro (Igarashi, 1970), and now Yamagata-ken.

Distribution: Kyushu northward to southern Hokkaido; Korea (Komai, 2001).

Paguristes japonicus Miyake, 1961c

Figs. 21, 22

Paguristes sp. - Miyake, 1961b: 169.

Paguristes japonicus Miyake, 1961c: 243, figs. 5, 6. - Miyake et al., 1962: 125. - Kim, 1964: 4, 8. - Kim, 1970: 12. - Kim, 1973: 212, 597, text-fig. 43, pl. 68, fig. 24a, b. - Miyake, 1978: 27 (key), 44, text-fig. 16, pl. 3, fig. 6. - Miyake & Imafuku, 1980: 4. - Miyake, 1982: 97, pl. 33, fig. 3, 215 (key). - Komai et al., 1992: 196.

Material Examined.

1♂, SL = 9.20 mm, Nyudo-zaki, Oga Peninsula, Akita-ken, 18 May 1979, coll. Tohru Imaoka, OMNH Ar 2133 (Z80-02); 2♂, SL = 6.60 - 8.60 mm, Nyudo-zaki, Oga Peninsula, Akita-ken, 18 May 1979, coll. Tohru Imaoka, OMNH Ar 2131, 2132 (Z80-02).

Type material examined: Paratype (allotype), 1♀, SL = 2.65 mm, 75-80 m, 2.5 km, off southeast of Jogashima Islet, Sagami Bay, 6 June 1960, Miyake det. No. 369, NSMT-Cr R1753; paratype, 1♂, SL = 4.05 mm, 120 m, west of Kamegisho, Sagami Bay, 1 June 1960, Miyake det. No. 340, NSMT-Cr R1724.

Comparative material examined: 1♂, SL = 3.95 mm, 102 m, 5 km off south of Jogashima Islet, Sagami Bay, 27 July 1957, Miyake det. No. 296, NSMT-Cr R1627; 1♂, SL = 7.25 mm, 2♀, SL = 3.40 - 5.65 mm, 90 m, 3.5 km off southwest of Jogashima Islet, Sagami Bay, 25 Mar. 1967, Miyake det. No. 630, NSMT-Cr R3536.

Records from the Sea of Japan: Tsuyazaki (Fukuoka-ken), Tottori-ken, Hokkaido (Miyake et al., 1962; Miyake, 1978), and now Akita-ken.

Distribution: Kyushu northward to southern Hokkaido; Cheju, Korea (Miyake, 1978; Kim, 1973).

Paguristes ortmanni Miyake, 1978

Figs. 23, 24

Paguristes barbatus - Ortmann, 1892: 279, pl. 12, fig. 7. - Doflein, 1902: 645. - Balss, 1913: 39. - Yokoya, 1939: 278, fig. 10A, B. - Miyake, 1960b: 93, pl. 46, fig. 5. - Miyake, 1975: 238, pl. 112, fig. 9. - Miyake et al., 1962: 125. - Kim, 1964: 4, 8. - Igarashi, 1970: 3, pl. 3, fig. 7. - Kim, 1970: 12. - Kim, 1973: 210, 597, text-fig. 42, pl. 5, fig. 23. [Not *Paguristes barbatus* Heller, 1862]

?*Paguristes barbotus* (sic.) - Honma & Kitami, 1978: 43.

Paguristes ortmanni Miyake, 1978: 27 (key), 46, text-fig. 17, pl. 2, fig. 1. - Miyake & Imafuku, 1980: 4. - Miyake, 1982: 97, pl. 33, fig. 3, 215 (key). - Komai et al., 1992: 196.

Material Examined

1♂, SL = 12.30 mm, 1♀, SL = 9.00 mm, rocky shore, intertidal, Iso, Kyoto-fu, Tango Peninsula, 10 June 2003, coll. H. Motoh (No. 2), CBM-ZC 8449; 1♂, SL = 7.55 mm, coast of Kyoto-fu, 5 Nov. 2003, coll. H. Motoh (E), CBM-ZC 8463; 1♀, SL = 10.55 mm, Kunda, Miyazu-shi, Kyoto-fu, Wakasa Bay, June 2004, coll. H. Motoh (H), gill net, CBM-ZC 8465; 1♀, SL = 5.85 mm, Kanmuri-jima Island, Kyoto-fu, Wakasa Bay, 17 July 2004, coll. H. Motoh (I), ?diving, CBM-ZC 8466; 1♂, SL = 8.10 mm, rocky shore, Kurosaki, Nanao-shi, Ishikawa-ken, 30 July 2000, coll. NoNu, TOYA Z2000-14-b; 1♀, SL = 6.20 mm, Nakaoki, Himi-shi, Toyama-ken, 24 Aug. 1978, coll. NoNu, TOYA Z78-59-b; 2♂, SL = 7.10-7.50 mm, Kurosaki, Nanao-shi, Ishikawa-ken, 11 Sept. 1979, coll. NoNu, TOYA Z79-85-b; 1♂, SL = 6.45 mm, Kurosaki, Nanao-shi, 7 Aug. 1992, coll. NoNu, TOYA Z92-24-b.

Records from the Sea of Japan: Tsuyazaki, Tottori-ken, Yamagata-ken (Miyake et al., 1962), Oshoro Bay (Igarashi, 1970) and now Wakasa Bay; Korea Strait (Miyake, 1978; Kim, 1973).

Distribution: Coasts of the Sea of Japan, Pacific coasts from Hokkaido to Kyushu (Komai, 2001).

***Dardanus arrosor* (Herbst, 1796)**

Figs. 25, 26

Cancer arrosor Herbst, 1796: 2: 170, pl. 43, fig. 1.

Pagurus striatus P. Roux, 1828. - H. Milne Edwards, 1836: 270. - De Haan, 1849: 204, 206, pl. 49, fig. 1. - Stimpson, 1858: 233. - Ortmann, 1892: 283. - Doflein, 1902: 645. - Stimpson, 1907: 206.

Pagurus arrosor - Balss, 1913: 46. - Terao, 1913: 375. - Yokoya, 1933: 78. - Kamita, 1941: 66.

Dardanus arrosor - Makarov, 1962: 159, pl. 1, fig. 1. - Miyake et al., 1962: 125. - Miyake, 1965: 643, fig. 1077. - Suzuki, 1971: 96, pl. 33, fig. 2. - Kim, 1973: 200, 595, pl. 4, fig. 18. - Miyake, 1975: 327, pl. 114, figs. 1, 7. - Miyake, 1978: 57, text-fig. 20, pl. 1, fig. 5. - Miyake & Imafuku, 1980: 6. - Miyake, 1982: 107, pl. 36, fig. 3. - Yamaguchi & Baba, 1993: 273, fig. 72.

Material Examined

1 ov. ♀, SL = 14.55 mm, Tassha, Aikawa, Sado Island, Niigata-ken, coll. Takehiko Kitami, SMBL-NU 22487.

Records from the Sea of Japan: South-west of Tsushima Islands, Tsushima Strait, north of Nagat (Yamaguchi-ken), north of Iwami (Shimane-ken), and north of Noto (Ishikawa-ken)(Yokoya, 1933); Tottori-ken and Niigata-ken; Korea Strait (Miyake, 1978, 1982; Kim, 1973).

Distribution: Widely distributed from Mediterranean Sea, Red Sea and western Africa, east to Philippines, Taiwan, New Zealand and Australia; in Japan, northward to the Boso Peninsula (Pacific coast) or Niigata-ken (Sea of Japan coast).

***Dardanus aspersus* (Berthold, 1845)**

Figs. 27, 28

Pagurus aspersus Berthold, 1845: 21, pl. 2, fig. 1.

Pagurus diogenes - De Haan, 1849: 208. - Ortmann, 1892: 285. - Terao, 1913: 377. [Not *Cancer diogenes* Linnaeus, 1758]

Dardanus diogenes - Miyake et al., 1962: 125. - Miyake, 1965: 644, fig. 1080. - Utinomi, 1956: 65, pl. 33, fig. 1. - Suzuki, 1971: 96, pl. 33, fig. 4. [Not *Cancer diogenes* Linnaeus, 1758]

Dardanus aspersus - Miyake, 1975: 191, pl. 114, fig. 4. - Miyake, 1978: 64, text-fig. 23, pl. 1, fig. 2. - Miyake & Imafuku, 1980: 6. - Miyake, 1982: 109, pl. 37, fig. 2. - Yamaguchi & Baba, 1993: 275, fig. 74. - McLaughlin, 2002a: 431.

Material Examined

1♂, SL = 18.00 mm, off Iwase, Toyama-shi, 16 Aug. 1997, coll. Sachi Mizusawa, TOYA Z97-13; 1♂, SL = 9.15 mm, 1♀, SL = 19.10 mm, Yura, Miyazu-shi, Kyoto-fu, Wakasa Bay, 11 Sept. 2003, coll. H. Motoh (No. 6), gill net, CBM-ZC 8451.

Records from the Sea of Japan: Tottori-ken (Miyake et al., 1962), and now Toyama Bay and Wakasa Bay.

Distribution: Kyushu northward to Boso Peninsula (Pacific coasts) or to Toyama Bay (Sea of Japan); Taiwan; Thailand (McLaughlin, 2002a).

***Dardanus crassimanus* (H. Milne Edwards, 1836)**

Figs. 29, 30

Pagurus crassimanus H. Milne Edwards, 1836: 277.

Pagurus setifer - De Haan, 1849: 209. [Not *Pagurus setifer* H. Milne Edwards, 1836]

Pagurus sculptipes Stimpson, 1858: 287. - Ortmann, 1892: 287. - Doflein, 1902: 646. - Alcock, 1905a: 83, pl. 8, fig. 3. - Stimpson, 1907: 205. - Balss, 1913: 48.

Dardanus crassimanus - Utinomi, 1956: 64, pl. 32, fig. 6. - Miyake, 1961a: 11. - Miyake et al., 1962: 125. - Miyake, 1965: 643, fig. 1079. - Suzuki, 1971: 96, pl. 33, fig. 3. - Kim, 1973: 204, 596, fig. 37, pl. 4, fig. 20. - Miyake, 1975: 197, pl. 14, fig. 5. - Miyake, 1978: 61, text-fig. 22, pl. 1, fig. 1. - Miyake & Imafuku, 1980: 5. - Miyake, 1982: 110, pl. 37, fig. 5. - Yamaguchi & Baba, 1993: 274, fig. 73.

Material Examined

1♂, SL = 22.75 mm, Kanmuri-jima Island, Kyoto-fu, Wakasa Bay, 27 June 2004, coll. H. Motoh (A), diving, CBM-ZC 8458.

Records from the Sea of Japan: Now Wakasa Bay.

Distribution: Indo-west Pacific from east coast of Africa to Hong Kong, Taiwan; in Japan, to Boso Peninsula and now Sea of Japan.

***Dardanus impressus* (De Haan, 1849)**

Pagurus impressus De Haan, 1849: 204, 207, pl 49, fig. 3. - Balss, 1913: 46, figs. 30, 31. - Terao, 1913: 378. - Yokoya, 1933: 79.

Dardanus impressus - Rathbun, 1902: 34. - Miyake et al., 1962: 125. - Miyake, 1965: 645: fig. 1084. - Kim, 1973: 202, 595, text-fig. 36, pl. 4, fig. 19. - Miyake, 1978: 65, text-fig. 24. - Miyake & Imafuku, 1980: 7. - Miyake, 1982: 109, pl. 37, fig. 1. - Yamaguchi & Baba, 1993: 276, fig. 75.

Records from the Sea of Japan: South-east of Tsushima Islands (Yokoya, 1933) and Yamagata-ken (Miyake et al., 1962); Korea Strait (Kim, 1973).

Distribution: Kyushu northward to Boso Peninsula (Pacific coast) or to Yamagata-ken (sea of Japan coast); Korea; Taiwan.

***Dardanus pedunculatus* (Herbst, 1804)**

Cancer pedunculatus Herbst, 1804: 25, pl. 61, fig. 3.

Pagurus asper De Haan, 1849: 204, 208, pl. 49, fig. 4. - Stimpson, 1858: 233.

Dardanus haani Rathbun, 1902: 34. - Miyake et al., 1962: 125 - Miyake, 1965: 644, fig. 1083.

Dardanus pedunculatus - Miyake, 1978: 60, text-fig. 21. - Miyake & Imafuku, 1980: 6. - Miyake, 1982: 108, pl. 36, fig. 6.

Records from the Sea of Japan: Tottori-ken, Toyama-ken, and Niigata-ken (Miyake et al., 1962).

Distribution: Indo-West Pacific from east coast of Africa to Hawaii; in Japan, northward to the Boso Peninsula (Pacific coast) or to Niigata-ken (Sea of Japan coast).

Family Paguridae Latreille, 1802

***Pagurus ochotensis* Brandt, 1851**

Figs. 31, 32

Pagurus (Eupagurus) bernhardus var. *B. granulato-denticulata* Brandt, 1851: 107.

Pagurus (Eupagurus) bernhardus var. *C. spinimana* or sp. *ochotensis* Brandt, 1851: 108.

Eupagurus ochotensis - Stimpson, 1858: 278 (in part). - Stimpson, 1907: 218. - Balss, 1913: 60. - Yokoya, 1933: 82. - Yokoya, 1939: 284. - Urita, 1942: 43, fig. 13. - Kamita, 1954-58: 42, fig. 18, 60, 69.

Eupagurus (Eupagurus) alaskensis Benedict, 1892: 2.

Pagurus ochotensis - Makarov, 1962: 188, figs. 44, 69B, pl. 2, fig. 2. - Miyake et al., 1962: 125. - Kim, 1964: 8. - Igarashi, 1970: 5, pl. 4, fig. 12. - Kim, 1970: 7. - McLaughlin, 1974: 57, figs. 15, 16. - Miyake, 1975: 116, 221. - Miyake, 1982: 125, pl. 42, fig. 3. - Komai et al., 1992: 197.

Eupagurus ortmanni Balss, 1911: 7.

Eupagurus spinimanus - Terao, 1913: 372. [Not *Pagurus spinimanus* (H. Milne Edwards, 1848)].

Material Examined

2♀, SL = 12.80-21.00 mm, 228 m, Mogami-tai (Mogami Basin), 100-150 km off Yamagata-ken, 20 Sept. 1973, YPM-SS 1724, A-18; 1♂, SL = 19.35 mm, Nezugaseki, Shonaihama, Yamagata-ken, coll. Suzuki, 1969, MYU.

Records from the Sea of Japan: Off Sado Island (Yokoya, 1933), Oshoro (Igarashi, 1970), Korea (Kamita, 1955; Kim, 1973), continental coast of Sea of Japan (Makarov, 1962).

Distribution: Siberia, Kamchatka, Okhotsk Sea, Sakhalin, Kuril Islands, Peter the Great Bay, Sea of Japan, Avachinskaya Guva to Inubo-zaki (Honshu, Japan), Pribilof Islands, Bering Sea to Oregon (McLaughlin, 1974; Miyake, 1982).

***Pagurus middendorffii* Brandt, 1851**

Figs. 33, 34

Pagurus (Eupagurus) Middendorffii Brandt, 1851: 108, pl. 5, figs. 1-6.

Eupagurus middendorffii - Stimpson, 1858: 250. - Stimpson, 1907: 226. - Balss, 1913: 58. - Yokoya, 1939: 281, fig. 11. - Kamita, 1954-58: 38, fig. 15, 60.

Eupagurus middendorffii (sic) - Ortmann, 1892: 301. - Doflein, 1902: 646. - Terao, 1913: 371. - Urita, 1942: 45.

Pagurus middendorffii - Rathbun, 1904: 160. - Makarov, 1962: 165 (not pl. 5, fig. 6). - Kim, 1964: 8. - Kim, 1970: 7. - Kim, 1973: 218, text-fig. 46, pl. 5, fig. 26. - McLaughlin, 1974: 185, figs. 45-47. - Miyake, 1982: 127, pl. 43, fig. 1. - Komai et al., 1992: 197.

Material Examined

1♂, SL = 4.20 mm, intertidal, Tomari-mura, Shakotan Peninsula, west coast of Hokkaido, coll. Tadashi Kawai, 2 June 2005, CBM - ZC.

Records from the Sea of Japan: Yamagata-ken, Oshoro (Hokkaido) (Igarashi, 1970), east coast of Korea (Kamita, 1955; Kim, 1973).

Distribution: Russia, Bering Sea, Kuril Islands, Sakhalin, Okhotsk Sea, Hokkaido, Sea of Japan (McLaughlin, 1974; Miyake, 1982).

***Pagurus filholi* De Man, 1887**

Figs. 35, 36

Eupagurus samuelis - Stimpson, 1858: 250. - Ortmann, 1892: 301, pl. 12, fig. 12. - Doflein, 1902: 646. - Balss, 1913: 61. - Terao, 1913: 371. [Not *Eupagurus samuelis* Stimpson, 1857].

Pagurus filholi De Man, 1887: 707, fig. 3. - Sandberg & McLaughlin, 1993: 198, figs. 1, 3. - Kim, 1973: 228, text-fig. 51, pl. 70, fig. 32.

Pagurus samuelis - Makarov, 1962: 179 (in part; not pl. 3, fig. 6). - Miyake et al., 1962: 125. - Kim, 1964: 4. - Utinomi, 1956: 65, pl. 33, fig. 4. - Honma & Kitami, 1978: 43. [Not *Eupagurus samuelis* Stimpson, 1857]

Pagurus geminus McLaughlin, 1976: 16, figs. 1-3. - Miyake, 1978: 112, text-figs. 46, 47, pl. 1, fig. 3. - Miyake & Imafuku, 1980: 60. - Miyake, 1982: 126, pl. 42, fig. 6. - Komai et al., 1992: 197.

Material Examined

5♂, SL = 3.70-5.50 mm, Yokataminatomachi, Toyama-shi, 20 July 2000, coll. NoNu, TOYA Z2000-12; 1♂, SL = 5.90 mm, rocky shore, Kurosaki, Nanao-shi, Ishikawa-ken, 30 July 2000, coll. NoNu, TOYA Z2000-14-a; 1♂, SL = 8.10 mm, rocky shore, Kurosaki, Nanao-shi, Ishikawa-ken, 30 July, 2000, coll. NoNu, TOYA Z2000-14-b; 1♂, SL = 7.45 mm, Amaharashi, Takaoka-shi, 3 Aug. 1978, coll. NoNu, TOYA Z78-54; 2♂, SL = 6.65-7.55 mm, Nakanami, Himi-shi, 24 Aug. 1978, coll. Hisao Nambu, TOYA Z78-59-a; 1♀, SL = 6.20 mm, Nakaoki, Himi-shi, Toyama-ken, 24 Aug. 1978, coll. NoNu, TOYA Z78-59-b; 2♂, SL = 5.10-5.50 mm, 1♀, SL = 4.95 mm, Amaharashi, Takaoka-shi, Toyama-ken, 6 Sept. 1978, coll. NoNu, TOYA Z78-67; 1♀, SL = 2.75 mm, Amaharashi, Takaoka-shi, Toyama-ken, 22 July, 1996, coll. NoNu, TOYA Z96-14-a; 1♂, SL = 2.75, 1♀, SL = 3.70 mm, Amaharashi, Takaoka-shi, Toyama-ken, 22 July 1996, coll. NoNu, TOYA Z96-14-b; 1♂, SL = 7 mm, Amaharashi, Takaoka-shi, Toyama-ken, 22 July, 1996, coll. NoNu, TOYA Z96-14-c; 1 juv♂, SL = 1.60 mm, Kokubunhama, Takaoka-shi, Toyama-ken, 12 Aug. 1996, coll. NoNu, TOYA Z96-19; 2 juv♂, SL = 1.80-1.85 mm, Miyazaki, Asahi-machi(?), 2 Sept. 1982, coll. NoNu, TOYA Z82-44; 2♀, SL = 4.40-5.05 mm, Oozakai, Himi-shi, 6 Sept. 1982, coll. NoNu, TOYA Z82-45; 1♂, SL = 17.00 mm, Amaharashi, Takaoka-shi, 11 May 1982, coll. NoNu, TOYA Z82-9; 5♂, SL = 2.80-5.70 mm, 4♀, SL = 4.05-4.90 mm, Amaharashi, Takaoka-shi, 9 Oct. 1983, coll. NoNu, TOYA Z83-69; 1♂, SL = 4.35 mm, Kosakai, Himi-shi, 11 Nov. 1983, coll. Hisao Nambu, TOYA Z83-84; 9♂, SL = 3.70-5.50 mm, 2♀, SL = 3.80-4.50 mm, Kurosaki, Nanao-shi, Ishikawa-ken, 19 Aug. 1984, coll. Michito Ota, TOYA Z84-42; 1♂, SL = 7.90 mm, Ashiarai, Shinminato-shi, 17 Aug. 1984, coll. Hisayoshi Kuroda, TOYA Z84-44; 2♂, SL = 6.70-7.20 mm, Yoshitsuna-iwa, Amaharashi, Takaoka-shi, 24 July, 1987, coll. NoNu, TOYA Z87-17-b; 1♂, SL = 5.35 mm, Yoshitsuna-iwa, Amaharashi, Takaoka-shi, 24 July 1987, coll. NoNu, TOYA Z87-17-c; 1♂, SL = 6.10 mm, Amaharashi, Takaoka-shi, 7 June 1981, coll. NoNu, TOYA Z81-13; 1♂, SL = 5.35 mm, Amaharashi, Takaoka-shi, 28 May 1982, coll. NoNu, TOYA Z82-16; 1♂, SL = 4.35 mm, Kosakai, Himi-shi, 11 Nov. 1983, coll. Hisao Nambu TOYA Z83-84; 20♂, SL = 3.95-5.10 mm, 5♀, SL = 3.20-6.00 mm, Amaharashi, Takaoka-shi, 2 Aug. 1990, coll. Hisao Nambu, TOYA Z90-34-a; 2♀, SL = 4.05-4.60 mm, Enome, Katsuzaki, Notozima-machi, Ishikawa-ken, 30 July 1990, coll. Hisao Nambu TOYA Z90-39.

Records from the Sea of Japan: This species is very common in both the Pacific and Sea of Japan coasts in temperate Japan and continental coasts of the Sea of Japan.

Distribution: Kamchatka, Kuril Islands, Nahkodka, Olga Bay, Possjet Bay, Petra Velikogo Bay; Korea, Taiwan; Japan (Hokkaido, Honshu, Shikoku, Kyushu)(Miyake, 1978; Kim, 1973). Miyake 's (1978) record of this species from the Ogasawara Islands should be for *Pagurus insulae* Asakura, 1991 (Asakura, 2003).

***Pagurus minutus* Hess, 1865**

Figs. 37, 38

Pagurus minutus Hess, 1865: 180 (part). - Sandberg & McLaughlin, 1993: 219, figs. 2, 4. - Komai & Mishima, 2003: 15, figs. 1-6.

Eupagurus dubius Ortmann, 1892: 307 (part), pl. 12, figs. 12, 14k. - Doflein, 1902: 646. - Balss, 1913: 55.

?*Eupagurus dubius* - Yokoya, 1939: 284.

Not *Eupagurus dubius*: Yokoya, 1933: 81. (species unknown)

Pagurus dubius - Miyake, 1961a: 12. - Miyake, 1961b: 169. - Kim, 1973: 227, text-fig. 51, pl. 70, fig. 31. - Miyake, 1975: 326, pl. 115 fig. 4. - Miyake, 1978: 99, text-fig. 38, pl. 1 fig. 6. - Miyake, 1982: 127, pl. 43, fig. 2. - Miyake & Imafuku, 1980: 60. - Komai et al., 1992: 197. - Asakura, 1995: 363, pl. 97, fig. 10.

?*Pagurus dubius* - Makarov, 1962: 178, pl. 3, fig. 5.

Not *Pagurus dubius*: Igarashi, 1970: pl. 3, fig. 10. [=?*Pagurus trigonocheirus* Stimpson, 1858].

Material Examined

1♂, SL = 5.70 mm, intertidal, Asonoumi (Amanohashidate), Kyoto-fu, Wakasa Bay, 12 Aug. 2004, coll. H. Motoh (G), CBM-ZC 8464; 1♂, SL = 3.85 mm, Amaharashi, Takaoka-shi, 18 Apr. 1978, coll. NoNu, TOYA Z78-7; 1♀, SL = 3.30 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-s; 1♂, SL = 3.35 mm, Konoura, Notozima-machi, Ishikawa-ken, 29 June 1984, coll. NoNu, TOYA Z84-21-a; 1♂, SL = 3.50 mm, Konoura, Notozima-machi, Isikawa-ken, 29 June 1984, coll. NoNu, TOYA Z84-21-b; 2♂, SL = 2.80-3.30 mm, Konoura, Notozima-machi, Ishikawa-ken, 29 June 1984, coll. NoNu, TOYA Z84-21-c; 1♂, SL = 5.35 mm, Yoshitsuna-iwa, Amaharashi, Takaoka-shi, 24 July 1987, coll. NoNu, TOYA Z87-17-c; 1♂, SL = 3.10 mm, Koshinoe, Shinminato-shi, 14 Sept. 1987, coll. Shingo Nunomura, TOYA Z87-28; 2♂, SL = 3.50-4.90 mm, Ameharashi, Takaoka-shi, 2 Aug. 1990, coll. Hisao Nambu, TOYA Z90-34-c; 1 juv., SL = 1.60 mm, Kokubunhama, Takaoka-shi, Toyama-ken, 12 Aug. 1996, coll. NoNu, TOYA Z96-19; 1♂, SL = 6.35 mm, Otaki, Himi-shi, 06 June 1982, coll. NoNu, TOYA Z82-19-b.

Remarks: This species is one of the most common hermit crabs in Japan, and it was well known as *Pagurus dubius* prior to Komai & Mishima (2003).

Records from the Sea of Japan: Various localities in the region including Fukuoka, Wakasa Bay, Noto (Ishikawa-ken), Toyama Bay, Ishikari Bay as well as north of Olga Bay (Russia) and Korea Strait (Miyake, 1978; Komai and Mishima, 2003).

Distribution: Known from temperate waters in East Asia: southern Hokkaido to Kyushu, Okinawa; Primorye, Russia; Korea; north eastern coast of China; west coast of Taiwan (Komai and Mishima, 2003).

***Pagurus lanuginosus* De Haan, 1849**

Figs. 39, 40

Pagurus lanuginosus De Haan, 1849: 204, pl. 49, fig. 2. - Miyake, 1960: 93, pl. 46, fig. 3. - Miyake et al., 1962: 125. - Makarov, 1962: 201 (part), pl. 5, fig. 2. - Kim, 1964: 9. - Kim, 1970: 7. - Kim, 1973: 237, 602, pl. 71, fig. 37a, b. - Holthuis & Sakai, 1970: 96. - Igarashi, 1970: 7, pl. 5, fig. 15. - Miyake, 1978: 81 (part), text-figs. 29, 30. - Komai et al., 1992: 197.

?*Pagurus lanuginosus* - Honma & Kitami, 1978: 43.

Eupagurus lanuginosus: Ortmann, 1892: 312 (? part). - Doflein, 1902: 647 (?part). - Balss, 1913: 56 (?part), fig. 33. - Terao, 1913: 370 (?part).

Not *Pagurus lanuginosus* Miyake, 1975: pl. 115, fig. 2. - Miyake & Imafuku, 1980: 59. - Miyake, 1982: pl. 42, fig. 2. - Asakura, 1995: 363, pl. 97, fig. 11 [= *Pagurus maculosus* Komai and Imafuku, 1996]

Material Examined

1♂, SL = 5.90 mm, rocky shore, Kurosaki, Nanao-shi, Ishikawa-ken, 30 July 2000, coll. NoNu, TOYA Z2000-14-a; 2♂, SL = 6.65-7.55 mm, Nakanami, Himi-shi, 24 Aug. 1978, coll. Hisao Nambu, TOYA Z78-59-a; 2♂, SL = 5.10-5.50 mm, 1♀, SL = 4.95 mm, Amaharashi, Takaoka-shi, Toyaka-ken, 6 Sept. 1978, coll. NoNu, TOYA Z78-67; 1♀, SL = 4.05 mm, Ao, Himi-shi, 11 Sept. 1979, coll. Toyama Fish. St., TOYA Z80-189-d; 1♀, SL = 4.55 mm, Otaki, Himi-shi 6 June 1982, coll. NoNu, TOYA Z82-19-c; 2♀, SL = 4.40-5.05 mm, Oozakai, Himi-shi, 6 Sept. 1982, coll. NoNu, TOYA Z82-45; 1♂, SL = 7.90 mm, Ashiarai, Shinminato-shi, 17 Aug. 1984, coll. Hisayoshi Kuroda, TOYA Z84-44; 1♀, SL = 7.45 mm, 1 ov.♀, SL = 9.40 mm, Kurosaki, Nanao-shi, 7 Aug. 1992, coll. NoNu, TOYA Z92-24-a; 1♂, SL = 7.00 mm, Amaharashi, Takaoka-shi, Toyama-ken, 22 July 1996, coll. NoNu, TOYA Z96-14-c.

Remarks: Komai and Imafuku (1996) disclosed that the two species were confounded under the name of *Pagurus lanuginosus*, viz., *P. lanuginosus* sense stricto and *P. maculosus* Komai and Imafuku, 1996. The latter was known from the Pacific coasts of Japan. However, the species was recently recorded from Noto, Sea of Japan (Myorin per. com), although I have had no opportunity to examine the specimen.

Records from the Sea of Japan: Tsuyazaki (Fukuoka-ken), Tottori-ken, Wakasa-Takayama (Fukui-ken), Toyama-ken, Niigata-ken, and Yamagata-ken; Korea; Peter the Great Bay (Russian coast of Sea of Japan) (Miyake et al., 1962; Komai and Imafuku, 1996).

Distribution: Temperate region of northwestern Pacific : Hokkaido to Kyushu; Peter the Great Bay ; Korea (Komai and Imafuku, 1996).

Pagurus nigrofascia Komai, 1996

Figs. 41, 42

Pagurus nigrofascia Komai, 1996: 60, figs. 1-6. - Mishima, 1997: 19, figs. 2, 3. - Mishima 1998: 9, fig. 2. - Mishima, 2003: 14, fig. 2.

Material Examined

2♂, SL = 4.45 - 5.55 mm, Tsukumo Bay, Noto Peninsula, coll. Yamaguchi, OMNH Ar 2135, 2136 (Z80-02).

Records from the Sea of Japan: Tsuyazaki (Fukuoka-ken)(Mishima, 1997, 1998, 2003) and now Noto Peninsula.

Distribution: Hakodate, Wakayama, Amakusa, and Fukuoka and Noto of Sea of Japan.

Pagurus conformis De Haan, 1849

Pagurus conformis De Haan, 1849: 204. - Holthuis & Sakai, 1970: 96, 295. - Miyake, 1978: 83. - Yamaguchi & Baba, 1993: 280, fig. 79. - Yamaguchi & Baba, 2003: 27.

Eupagurus conformis - Ortmann, 1892: 298, 305. - Doflein, 1902: 647. - Balss, 1913: 52 (key). - Terao, 1913: 366 (list).

Eupagurus megalops Stimpson, 1858: 248. - Alcock, 1905a: 176. - Stimpson, 1907: 216, pl. 24, fig. 2. - Terao, 1913:

370.

Pagurus megalops - Miyake, 1960: 93, pl. 46, fig. 1. - Miyake, 1961a: 12. - Miyake, 1961b: 169. - Miyake, 1962: 125. - Miyake, 1965: 646, fig. 1089. - Kim, 1973: 223, 599, fig. 49. - Miyake, 1978: 84, fig. 31. - Miyake & Imafuku, 1980: 59. - Miyake, 1982: 128, pl. 43, fig. 4. - Komai et al., 2002: 20.

Remarks: Komai's (2004) critical reexamination of specimens referred to *Pagurus conformis* or *P. megalops* (Stimpson, 1858) revealed that the two taxa were conspecific; the former was a senior synonym of the latter. See Komai (2004) for full synonymy.

Yokoya (1933) recorded this species (as *Eupagurus conformis*) from a few localities in the Sea of Japan, viz., south-west of Tsushima Islands and north of Nagato (Yamagata-ken). However, Komai (2004) remarked that Yokoya (1933) provided no morphological information so that it is impossible to determine whether Yokoya's material was actually *P. conformis*. In this paper too, the records by Yokoya (1933) is excluded according to Komai (2004).

Records from the Sea of Japan: north of Karatsu, Saga-ken (Genkai Nada) (Komai et al., 2002; Komai, 2004).

Distribution: Pacific coasts of Japan from Kyushu to Boso Peninsula, southern part of the Sea of Japan, and East China Sea (Komai et al., 2002; Komai, 2004).

***Pagurus constans* (Stimpson, 1858)**

Fig. 43

Eupagurus constans Stimpson, 1858: 248. - Henderson, 1888: 67, pl. 6, fig. 8. - Ortmann, 1892: 310. - Doflein, 1902: 647. - Stimpson, 1907: 218, pl. 24, fig. 3. - Balss, 1913: 55. - Terao, 1913: 366. - Yokoya, 1933: 81. - Yokoya, 1939: 285. - Kamita, 1941-1958: 33, fig. 12.

Pagurus constans - Miyake, 1960: 93, pl. 46, fig. 2. - Miyake, 1961a: 12. - Miyake, 1961b: 169. - Miyake, 1962: 125. - Miyake, 1965: 647, fig. 1094. - Igarashi, 1970: 8, pl. 5, fig. 18. - Suzuki, 1971: 96, pl. 33, fig. 7. - Kim, 1970: 7. - Kim, 1973: 244, 604, fig. 62, pl. 72, fig. 41a, b. - Miyake, 1978: 87, fig. 32. - Honma & Kitami, 1978: 43. - Miyake & Imafuku, 1980: 59. - Miyake, 1982: 132, pl. 44, fig. 4. - Komai et al., 1992: 197. - Asakura, 1995: 362, pl. 97, fig. 6.

Material Examined

2♀, SL = 4.95-5.10 mm, Fukura, off Nishihama, Yamagata-ken, 9 June 1975, YPM-SS 1546, A-16.

Records from the Sea of Japan: Sea of Japan from Korean Strait to Hokkaido, Russian coast of Sea of Japan (Komai, 1999); east coast of Korea.

Distribution: Hokkaido southward throughout the Pacific and Sea of Japan coasts to Kyushu; Russian coasts of Sea of Japan; Korea.

***Pagurus gracilipes* (Stimpson, 1858)**

Figs. 44, 45

Eupagurus gracilipes Stimpson, 1858: 248. - Alcock, 1905a: 177 (in part). - Stimpson, 1907: 217. - Yokoya, 1939: 281.

Pagurus gracilipes - Miyake, 1965: 647 (in part). - Makarov, 1962: 175 (in part), pl. 4, fig. 4. - Igarashi, 1970: 4, pl. 3, fig. 93. - Kim, 1973: 222, 598, fig. 48, pl. 5, fig. 28. - Miyake, 1975: 286 (in part). - Komai et al., 1992: 197.

Parapagurodes gracilipes - Komai, 1998: 268, figs. 1A, 2-5, 7.

Not *Eupagurus gracilipes* - Doflein, 1902: 647, pl. 6, figs. 6-8 - Balss, 1913: 56. - Terao, 1913: 368. [= *Pagurus nipponensis* (Yokoya, 1933)]

Not *Eupagurus gracilipes* - Yokoya, 1933: 98, fig. 33 [= *Pagurus yokoyai* Makarov, 1938]

Material Examined

1♀, SL = 8.00 mm, off Iwase, Toyama-shi, 19 June 1990, coll. Nozomu Miyamoto, TOYA Z90-21-b.

Records from the Sea of Japan: Continental coast of Russia Far East and now Toyama-ken.

Distribution: Hokkaido, northeastern Honshu southward to Choshi, Chiba-ken, or to Toyama-ken, Russian coast of Sea of Japan, Sakhalin (Komai, 1998).

Pagurus nipponensis (Yokoya, 1933)

Figs. 46, 47

Eupagurus gracilipes - Doflein, 1902: 647, pl. 6, figs. 6-8. - Balss, 1913: 56. - Terao, 1913: 368. [Not *Eupagurus gracilipes* Stimpson, 1858]

Eupagurus nipponensis Yokoya, 1933: 87, fig. 32.

Pagurus gracilipes - Miyake, 1965: 647 (in part), fig. 1093. - Makarov, 1962: 175 (in part). - Miyake, 1975: 286 (in part), pl. 116, fig. 5. - Miyake, 1978: 89, text-fig. 33, pl. 2, fig. 8. - Miyake & Imafuku, 1980: 59. - Miyake, 1982: 126 (in part), pl. 42, fig. 5.- Baba, in Baba, Hayashi & Toriyama, 1986: fig. 149, 201, 303. [Not *Pagurus gracilipes* (Stimpson, 1858)].

Parapagurodes nipponensis - Komai, 1998: 275, figs. 1B, 6, 7.

Material Examined

1♂, SL = 7.45 mm, 30 m, Nezugaseki, Shonaihama, Yamagata-ken, Aug. 1973, YPM-SS 1700, A-18; 1♂, SL = 6.90 mm, Odajyukuno, Miyazu-shi, Kyoto-fu, Wakasa Bay, 6 Sept. 2003, coll. H. Motoh (No. 4), gill net, CBM-ZC 8450.

Records from the Sea of Japan: Now Kyoto-fu and Yamagata-ken.

Distribution: Pacific coasts of Japan from Kashima (Ibaraki-ken) southward to Kagoshima-ken, Goto Islands, and Koshiki Islands; Taiwan (Komai, 1998).

Pagurus pectinatus (Stimpson, 1858)

Eupagurus pectinatus Stimpson, 1858: 249. - Stimpson, 1907: 220. - Balss, 1913: 60, fig. 35, pl. 1, fig. 8. - Terao, 1913: 371. - Yokoya, 1933: 83. - Yokoya, 1939: 280. - Urita, 1942: 42.

Eupagurus seriespinosus Thallwitz, 1891: 34. - Terao, 1913: 372.

Pagurus pectinatus - Igarashi, 1970: 7, pl. 5, fig. 17. - Kim, 1973: 242, text-figs. 60, 61, pl. 7, fig. 40. - Miyake, 1982: 131. - Komai et al., 1992: 197 - Komai, 2000a: 323, figs. 1-5.

Pagurus brachiomastus - Miyake, 1982: pl. 43, fig. 6 - Takeda, 1994: 228, fig. 4. [Not *Pagurus brachiomastus* (Thallwitz, 1891)]

?*Pagurus pectinatus* - Honma & Kitami, 1978: 43.

Records from the Sea of Japan: West and north-west of Tsushima Islands, Toyama Bay, north of the Sado Island,

and off the river mouth of the Mogami-gawa River (Yamagata-ken)(Yokoya, 1933), Oshoro (Igarashi, 1970), "Sea of Japan coast of Honshu mainland" (Komai, 2000a), Korea (Kim, 1973).

Distribution: Hokkaido, Pacific coast of northeastern Honshu mainland southward to Onagawa Bay (Miyagi-ken); Sea of Japan coasts of Honshu mainland; Sea of Japan coast of Russian Far East; East China Sea; Yellow Sea (Komai, 2000a); Korea.

Pagurus trigonocheirus (Stimpson, 1858)

Figs. 48-50

Eupagurus trigonocheirus Stimpson, 1858: 249. - Stimpson, 1907: 211, pl. 26, fig. 2. - Terao, 1913: 373. -Yokoya, 1933: 83.

Pagurus trigonocheirus - Makarov, 1962: 109. - Miyake et al., 1962: 125. - Kim, 1964: 8. - Kim, 1973: 234, text-fig. 55, pl. 6, fig. 35. - McLaughlin, 1974: 233, figs. 59, 60, pl. 1, figs. 1, 2. - Miyake, 1982: 126, pl. 42, fig. 4. - Komai et al., 1992: 197.

?*Pagurus trigonocheirus* - Honma & Kitami, 1978: 43.

Material Examined

2♂, SL = 17.90-18.65 mm, Toyama Bay, 19 Nov. 1987, coll. Toyama Pref. Fish Res. Center, TOYA Z88-28-b; 2♂, SL = 5.95-6.40 mm, 1♀, SL = 4.10 mm, Toyama Bay, 25 Mar. 1988, coll. NoNu, TOYA Z88-1.

Comparative material examined: 2♂, SL = 12.80-13.30 mm, 55 m, Bering Sea, 57°20'N, 163°28'W, 27 Aug. 1960, coll. USFWS, SBL-H-8, identified by P. A. McLaughlin, acc. no. 282239, USNM; 2♂, 1♀, SL = 11.70, 80 m, Bering Sea, 55°40'N, 163°23'W, 9 July 1961, coll. USFWS, SBL-C-8, identified by P. A. McLaughlin, acc. no. 282239, USNM.

Remarks: This species is frequently recorded from northern part of Japan. However, my identification herein is tentative, because the specimens from the Sea of Japan are somewhat different in terms of armature of the dactyls of the second and third pereopods (Fig. 50B, G) from the specimens collected from the Bering Sea (Fig. 50J, USNM). Further detailed observation on geographical variation of this species is needed.

Records from the Sea of Japan: North of Mikuni (Fukui-ken), north and northeast of Noto (Yokoya, 1933), Oshoro (Igarashi, 1970), and now Toyama Bay; east coast of Korea (Kim, 1973).

Distribution: Arctic Ocean, Bering Sea, Chukchi Sea, Aleutian Islands, Kamtchatka, Kuril Islands, Sakhalin, Sea of Japan, Korea, Pacific coasts of northern Japan southward to Inubo-zaki (McLaughlin, 1974; Miyake, 1982).

Pagurus undosus (Benedict, 1892)

Eupagurus (Trigonochirus) undosus Benedict, 1892: 18.

Pagurus undosus - McLaughlin, 1974: 252, figs. 64-66. - Komai, 1994: 24, fig. 1.

Records from the Sea of Japan: Continental coast of the Sea of Japan (Makarov, 1962; McLaughlin, 1974; Komai, 1994).

Distribution: Bering Sea, Sea of Okhotsk, continental coast of the Sea of Japan, Chukchi Sea, Pacific coasts of Hokkaido (McLaughlin, 1974; Komai, 1994).

Pagurus rathbuni (Benedict, 1892)

Figs. 51, 52

Eupagurus (Trigonocheirus) rathbuni Benedict, 1892: 14.

Pagurus rathbuni - Rathbun, 1904: 158, pl. 4, fig. 2. - Makarov, 1962: 193, pl. 3, fig. 3. - Miyake et al., 1962: 125. -

McLaughlin, 1974: 298, figs. 77-80. - Miyake, 1982: 225 (key). - Komai et al., 1992: 197.

Eupagurus rathbuni - Alcock, 1905a: 179. - Urita, 1942: 42, fig. 12 a, b.

Material Examined

1♂, SL = 13.50 mm, Yokata Fishery Harbor, Toyama-shi, 8 Nov. 1984, coll. Hisao Nambu, TOYA Z84-63; 7♂, SL = 4.00-6.60 mm, 1♀, SL = 5.50 mm, Namerikawa-shi and Iwase, 28 Sept., 1988, coll. Toyama Fish. St., TOYA Z88-28-a; 2♂, SL = 7.40-10.20 mm, 1♀, SL = 7.60 mm, 1 ov.♀, SL = 5.10 mm, off Mizuhashi, Toyama-shi, 08 Dec. 1990, coll. Nozomu Miyamoto, TOYA Z90-59; 7♂, SL = 5.05-9.70 mm, 1♀, SL = 6.20 mm, 2ov.♀, SL = 7.55-7.90 mm, off Mizuhashi, Toyama-shi, 16 Dec. 1990, coll. Nozomu Miyamoto, TOYA Z90-61; 4♂, SL = 7.65-13.65 mm, off Iwase, Toyama-shi, 26 Mar. 1991, coll. Nozomu Miyamoto, TOYA Z91-2; 2♂, SL = 6.15-6.90 mm, 1♀, SL = 7.35-9.00, 1ov.♀, SL = 6.60-7.90 mm, off Shinminato-shi, 19 Nov. 1991, coll. Isao Wada, TOYA Z91-54-b; 1♂, SL = 3.90 mm, off Shinminato-shi, 19 Nov. 1991, coll. Isao Wada, TOYA Z91-54-c; 1♂, SL = 12.20 mm, off Asahi-machi, Toyama-ken, 27 Nov. 1991, coll. NoNu, TOYA Z91-55; 1♂, SL = 7.80 mm, off Iwase, Toyama-shi, 6 Apr. 1993, coll. Nozomu Miyamoto, TOYA Z93-2-a; 4♂, SL = 4.40-6.05 mm, 2♀, SL = 5.20-6.00 mm, off Iwase, Toyama-shi, 6 Apr. 1993, coll. Nozomu Miyamoto TOYA Z93-2-b. **Comparative material examined:** 4♂, SL = 7.40-16.20 mm, 1♀, SL = 11.25 mm, 71 m, st. ABL-G6, Bering Sea, 56°58'N, 164°38'W, 09 July 1966, coll. USFWS, identified by P. A. McLaughlin, USNM.

Records from the Sea of Japan: Most of areas in the Sea of Japan (Takeda and Miyauchi, 1992), continental coast of the Sea of Japan.

Distribution: East Siberian Sea, Kamtchatka, Okhotsk Sea, Kuril Islands, Sea of Japan, Chukchi Sea, Bering Sea, Arctic Ocean.

Pagurus brachiomastus (Thallwitz, 1891)

Eupagurus brachiomastus Thallwitz, 1891: 35. - Ortmann, 1892: 312. - Terao, 1913: 365.

Pagurus brachiomastus - Igarashi, 1970: 7, pl. 5, fig. 16. - Makarov, 1962: 200, pl. 2, fig. 6. - Miyake, 1978: pl. 1, figs. 7, 8. - Komai et al., 1992: 197. - Komai, 2000b: 230, figs 1A, B, 2-6.

Pagurus pectinatus - Miyake, 1975: 116, 272, unnumbered fig. - Miyake, 1982: 132, pl. 44, fig. 3. - Takeda, 1994: 228, figs. 1, 2. [Not *Pagurus pectinatus* (Stimpson, 1858)]

Not *Eupagurus brachiomastus* - Kikuchi, 1932: 8. - Yokoya, 1939: 282 (part), fig. 12. [= *Pagurus proximus* Komai, 2000b]

Not *Pagurus brachiomastus* - Kim, 1970: 7. - Kim, 1973: 236, 601, pl. 70, fig. 30. [= *Pagurus proximus* Komai, 2000b]

Remarks. Regarding Kikuchi's (1932) record of this species from Toyama Bay, Komai (2000) mentioned "from the information on the geographical distribution of the three species (*P. brachiomastus*, *P. proximus* Komai, 2000b, and *P. simulans* Komai, 2000b), it is likely that Kikuchi was actually reporting *P. proximus*, instead of true *P. brachiomastus*".

Records from the Sea of Japan: Continental coasts of the Sea of Japan including Peter the Great Bay (Komai,

2000b).

Distribution: Continental coast of Sea of Japan, Sakhalin, and Hokkaido (Komai, 2000b).

***Pagurus proximus* Komai, 2000b**

Pagurus proximus Komai, 2000b: 241, figs. 1C, 7-10.

Eupagurus pectinatus - Balss, 1913: 60 (part)

Eupagurus brachiomastus - Kikuchi, 1932: 8. - Yokoya, 1939: 282 (part), fig. 12. [Not *Eupagurus brachiomastus* Thallwitz, 1891]

Pagurus brachiomastus - Kim, 1970: 7. - Kim, 1973: 236, 601, pl. 70, fig. 30. [Not *Pagurus brachiomastus* (Thallwitz, 1891)]

Records from the Sea of Japan: Korea (by implication by Komai, 2000b); Niigata-ken, the continental coast of the Sea of Japan (Komai, 2000b).

Distribution: "Peter the Great Bay, the continental coast of the Sea of Japan, Hakodate Bay, the Pacific coast of Honshu from Miyako Bay, Iwate Prefecture, southward to Boso Peninsula, and Niigata" (Komai, 2000b).

***Pagurus japonicus* (Stimpson, 1858)**

Figs. 53, 54

Eupagurus japonicus Stimpson, 1858: 250. - Stimpson, 1907: 226, pl. 25, fig. 2. - Terao, 1913: 369 (part).

Pagurus japonicus - Miyake, 1960: 90, pl. 45, fig. 4. - Miyake, 1965: 648, fig. 1096. - Suzuki, 1971: 97, pl. 34, fig. 3. - Kim, 1973: 239, 902, fig. 58, pl. 71, fig. 38. - Miyake, 1975: 323, pl. 115, figs. 7, 10. - Miyake, 1978: 94 (part), text-fig. 35, pl. 2, fig. 2. - Miyake & Imafuku, 1980: 60. - Miyake, 1982: 125, pl. 42, fig. 1.

?*Pagurus japonicus* - Honma & Kitami, 1978: 43.

Eupagurus barbatus Ortmann, 1892: 311. - Balss, 1913: 55. - Terao, 1913: 365. - Yokoya, 1933: 80.

Pagurus barbatus - Miyake et al., 1962: 125. - Miyake, 1978: 105, text-fig. 41. - Miyake & Imafuku, 1980: 60.

Not *Eupagurus japonicus* - Ortmann, 1892: 309, pl. 12, fig. 16. [= *Pagurus rubrior* Komai, 2003]

Not *Eupagurus barbatus* - Balss, 1913: 55. [= *Pagurus similis* (Ortmann, 1892)]

Material Examined

1♀, SL = 15.60 mm, Odajyukuno, Miyazu-shi, Kyoto-fu, late Aug. 2003, coll. H. Motoh (No. 13), gill net, CBM-ZC 8456; 1♂, SL = 18.30 mm, Odajyukuno, Miyazu-shi, Kyoto-fu, Wakasa Bay, 15 Nov. 2003, coll. H. Motoh (B), crab catch cage, CBM-ZC 8459; 1♂, SL = 6.40 mm, 1♀, SL = 7.15 mm, 1 ov. ♀, SL = 6.15 mm, Odajyukuno, Miyazu-shi, Kyoto-fu, Wakasa Bay, late Aug. 2003, coll. H. Motoh (B'), diving, CBM-ZC 8460; 2♂, SL = 6.30 - 8.30 mm, 2♀, SL = 13.45 - 14.70 mm, Kanmuri-jima Island, Kyoto-fu, Wakasa Bay, 27 June 2004, coll. H. Motoh (B''), diving, CBM-ZC 8461; 1♂, SL = 12.15 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-d; 1♂, SL = 18.75 mm, Oozakai, Himi-shi, 21 Aug. 1982, coll. NoNu, TOYA Z82-37.

Records from the Sea of Japan: Various localities in the region including Tsuyazaki (Fukuoka-ken), Takasa and Sayu beaches of Echizen Kaigan (Fukui-ken), Yasujima of Mikuni (Fukui-ken), Tottori-ken, Toyama-ken, Niigata-ken, Yamagata-ken, and now Wakasa Bay (Kyoto-fu); Korea (Miyake et al., 1962; Miyake, 1978; Komai, 2003).

Distribution: Kyushu to Boso Peninsula (Pacific coast), Sea of Japan coast of Kyushu to Honshu, Korea, northern China, Taiwan (Komai, 2003).

***Pagurus similis* (Ortmann, 1892)**

Eupagurus similis Ortmann, 1892: 310. - Yokoya, 1933: 86.

Pagurus similis - Miyake, 1960: 90 (part). - Miyake, 1978: 103 (part) - Miyake & Imafuku, 1980: 60 (part). - Miyake, 1982: 125.

Not *Pagurus similis* - Miyake, 1960: pl. 45, fig. 5. - Suzuki, 1971: 97, pl. 34, fig. 4. - Kim, 1973: pl. 7, fig. 39. - Miyake, 1975: pl. 115, fig. 6, 9. - Miyake, 1978: text-fig. 40, pl. 2, fig. 3. - Miyake, 1982: pl. 42, fig. 2. - Takeda, 1994: 228, fig. 5. - Asakura, 1995: 362, pl. 97, fig. 4. [= *Pagurus rubrior* Komai, 2003]

?*Pagurus similis* - Kim, 1964: 9. - Kim, 1973: 240, 603, fig. 59. - Honma & Kitami, 1978: 43.

Remarks: Two species had been confused under the name of *Pagurus similis* prior to Komai (2003). Miyake et al. (1962) recorded "*Pagurus similis*" from Tsuyazaki, Tottori-ken and Niigata-ken in the Sea of Japan. But, Komai (2003) could not locate the specimens, so that these records could not be confirmed.

Records from the Sea of Japan: Sea of Japan coasts of southern part of Honshu mainland and Korea (Komai, 2003).

Distribution: Pacific coasts of Japan from Ohsumi Islands northward to Boso Peninsula, Sea of Japan coast of southern part of Honshu mainland, Korea and northeastern part of Taiwan (Komai, 2003).

***Pagurus rubrior* Komai, 2003**

Figs. 55, 56

Eupagurus japonicus - Ortmann, 1892: 309, pl. 12, fig. 16. [Not *Eupagurus japonicus* Stimpson, 1858]

Pagurus similis. - Miyake, 1960: 90 (part), pl. 45, fig. 5. - Suzuki, 1971: 97, pl. 34, fig. 4. - Kim, 1973: pl. 7, fig. 39. - Miyake, 1975: pl. 115, figs. 6, 9. - Miyake, 1978: 103 (part), text-fig. 40, pl. 2, fig. 3. - Miyake, 1982: 125 (part), pl. 42, fig. 2. - Takeda, 1994: 228, fig. 5. - Asakura, 1995: 362, pl. 97, fig. 4. [Not *Pagurus similis* (Ortmann, 1892)]

Pagurus rubrior Komai, 2003: 401, figs. 6B, 12, 13.

Aniculus aniculus - Honma & Kitami, 1978: 43. [In part. Not *Aniculus aniculus* (Fabricius, 1787)]

Material Examined

2♂, SL=15.50-19.05 mm, Tassha, Sado Island, Niigata-ken, 11 July 1954, coll. Yoshiharu Honma, SMBL-NU 22487 (reported as *Aniculus aniculus* by Honma and Kitami, 1978); 1♂, SL = 11.55 mm, rocky shore in front of the Kyoto Sea Farming Center, Odajyukuno, Miyazu-shi, Kyoto-fu, Wakasa Bay, 27 June 2003, coll. H. Motoh (No. 9), CBM-ZC 8454; 1♂, SL = 12.85 mm, Musow, Miyazu-shi, Kyoto-fu, Wakasa Bay, 16 Oct. 2003, coll. H. Motoh (No. 9'), gill net, CBM-ZC 8455; 1♂, SL = 16.10 mm, Amaharashi, Takaoka-shi, 30 Oct. 1981, coll. NoNu, TOYA Z81-52-b; 1♂, SL = 17.00 mm, Amaharashi, Takaoka-shi, 11 May 1982, coll. NoNu, TOYA Z82-9; 1♂, SL = 11.80 mm, 1♀, SL = 9.35 mm, Doumi, Nanao-shi, Ishikawa-ken, 14 Aug. 1977, coll. NoNu AA-02.

Remarks: I reexamined the specimen reported as *Aniculus aniculus* from the Sado Island by Honma and Kitami (1978) and found it is actually *Pagurus rubrior*.

Records from the Sea of Japan: Sea of Japan coasts including Takasa, Echizen, Fukui-ken (Komai, 2003), now Wakasa Bay and Sado Island of the Honshu mainland and Korea (Komai, 2003).

Distribution: Pacific coast of Japan from Kyushu northward to Boso Peninsula, Sea of Japan coast of southern part of Honshu mainland; Korea (Komai, 2003).

***Pagurus erythrogrammus* Komai, 2003**

Pagurus erythrogrammus Komai, 2003: 133, figs. 12-15, 24C, 25A.

Pagurus pilosipes - Miyake, 1978: 91 (part), fig. 34a. [Not *Pagurus pilosipes* (Stimpson, 1858)]

Material Examined

1♀, SL = 2.05 mm, Kanmuri-jima Island, Kyoto-fu, Wakasa Bay, 5 June 2004, coll. H. Motoh (+α), diving, CBM-ZC 8457.

Records from the Sea of Japan: Takasa of Echizen (Fukui-ken), Oaji Beach of Koshino (Fukui-ken), Saki, Yasu-jima, Kaji of Mikuni (Fukui-ken)(Komai, 2003), and now Wakasa Bay.

Distribution: Kii Peninsula northward to Boso Peninsula (Pacific coast), and Fukui-ken (Komai, 2003) and Wakasa Bay on Sea of Japan coast .

***Pagurus nigrivittatus* Komai, 2003**

Pagurus nigrivittatus Komai, 2003: 141, Figs. 16-19, 24D, 25B.

Pagurus pilosipes - Miyake & Imafuku, 1980: 60, pl. 2, fig. 5. - Miyake, 1982: 132, pl. 44, fig. 5. - Asakura, 1995: 363, pl. 97, fig. 9. [Not *Pagurus pilosipes* (Stimpson, 1858)]

Records from the Sea of Japan: Takasa and Sou of Echizen (Fukui-ken), Kaji of Mikuni (Fukui-ken)(Komai, 2003).

Distribution: Kyushu northward to Boso Peninsula, and Fukui-ken on Sea of Japan coast; northeast of Taiwan (Komai, 2003).

Pagurus cf. nigrivittatus

Fig. 57

Material Examined

1♀, SL = 2.75 mm, Kanmuri-jima Island, Kyoto-fu, Wakasa Bay, 27 June 2004, coll. H. Motoh (X"), diving, CBM-ZC 8468.

***Pagurus quinquelineatus* Komai, 2003**

Fig. 58

Pagurus quinquelineatus Komai, 2003: 149, figs. 20-23, 24B, 25A.

Pagurus pilosipes - Miyake, 1978: 91 (part), fig. 34d. [Not *Pagurus pilosipes* (Stimpson, 1858)]

Material Examined.

1♂, SL = 2.90 mm, Kanmuri-jima Island, Kyoto-fu, Wakasa Bay, summer 2004, coll. H. Motoh (X), diving, CBM-ZC 8467.

Records from the Sea of Japan: Sou of Echizen (Fukui-ken)(Komai, 2003) and now Wakasa Bay.

Distribution: Suruga Bay, Sagami Bay, Boso Peninsula (all, Pacific coasts), and Fukui-ken (Komai, 2003) and now

Wakasa Bay (Kyoto-fu) on the Sea of Japan coasts.

Other Species of *Pagurus*

According to McLaughlin (1974), *Pagurus aleuticus* (Benedict, 1892) and *Pagurus capillatus* (Benedict, 1892) were recorded from the Sea of Japan. However, these were based on information from the old literature, so further collection effort and direct reexamination of the specimens reported in the previous literature are necessary before final conclusion.

Diacanthurus ophthalmicus (Ortmann, 1892)

Eupagurus ophthalmicus Ortmann, 1892: 314, pl. 12, fig. 19. - Alcock, 1905a: 177. - Terao, 1913: 371. - Yokoya, 1933: 86.

Pagurus ophthalmicus - Miyake, 1975: 319, pl. 116, fig. 1. - Miyake, 1978: 107, text-fig. 42. - Miyake & Imafuku, 1980: 60. - Miyake, 1982: 127, pl. 43, fig. 3. - Baba in Baba, Hayashi, and Toriumi, 1986: 209, fig. 153, 305.

Diacanthurus ophthalmicus - McLaughlin & Forest, 1997: 244, fig. 4.

Records from the Sea of Japan: Oga Peninsula (Akita-ken)(Yokoya, 1933).

Distribution: Koshiki-jima Islands northward to Oga Peninsula (Sea of Japan coast) and Kyushu to Sagami Bay (Pacific coast)(McLaughlin and Forest, 1997).

Lophopagurus (Australeremus) triserratus (Ortmann, 1892)

Fig. 59

Eupagurus triserratus Ortmann, 1892: 308, pl. 12, fig. 15. - Alcock, 1905a: 177. - Balss, 1913: 52 (key). - Terao, 1913: 373.

?*Eupagurus tricarinatus* - Balss, 1913: 58. [Not *Eupagurus tricarinatus* Stimpson, 1858]

Eupagurus (Eupagurus) triserratus - Melin, 1939: 29, figs. 9, 10.

Pagurus tricarinatus - Miyake, 1982: 197 (list). [Not *Pagurus tricarinatus* (Stimpson, 1858)]

Pagurus triserratus - Kim, 1964: 5, pl. 1, fig. 6. - Kim, 1970: 8. - Kim, 1973: 225, 599, fig. 50, pl. 65, fig. 30.

Pylopagurus serpulophilus Miyake, 1978: 120, pl. 4, fig. 4. - Miyake, 1982: 120, pl. 40, fig. 5.

Australeremus triserratus - McLaughlin & Gunn, 1992: 87, fig. 14, pl. 1. - McLaughlin, 1997: 521, fig. 2 a, c, g.

Lophopagurus (Australeremus) triserratus - de Saint Laurent & McLaughlin, 2000: 177, fig. 57.

Material Examined

1♀, SL = 2.15 mm, Kanmuri-jima Island, Kyoto-fu, Wakasa Bay, 5 Nov. 2003, coll. H. Motoh (D), diving, CBM-ZC 8462.

Record from the Sea of Japan: Now Wakasa Bay.

Distribution: East China Sea, South China Sea, Indonesia, southwestern Australia, New Zealand; Cheju, Korea; Amakusa northward to Sagami Bay (Pacific coast), Ogasawara Islands (de Saint Laurent & McLaughlin, 2000; Komai, 1999; Kim, 1973), and now Sea of Japan.

Elassochirus cavimanus (Miers, 1879)

Figs. 60, 61

Eupagurus cavimanus Miers, 1879: 21, 48, pl. 3, fig. 1. - Alcock, 1905a: 178. - Yokoya, 1933: 81.

Eupagurus (Elassochirus) munitus Benedict, 1892: 19.

Eupagurus gotoi Terao, 1913: 366, fig. 2.

Pagurus cavimanus - Miyake et al., 1962: 125. - Kim, 1973: 220, text-fig. 47, pl. 5, fig. 27. - Honma & Kitami, 1978: 43.

Pagurus cavimanus ? - Makarov, 1962: 146.

Pagurus cavimanus munitus - Makarov, 1962: 168.

Pagurus gilli cavimanus - Makarov, 1962: 168.

Not *Pagurus cavimanus* Balss, 1913: 58, fig. 34. [= *Elassochirus gilli* (Benedict, 1892)].

Not *Eupagurus munitus* - Balss, 1913: 58. [= *Elassochirus gilli* (Benedict, 1892)].

Not *Pagurus cavimanus* - Makarov, 1962: 147. [= *Elassochirus gilli* (Benedict, 1892)].

Elassochirus cavimanus - McLaughlin, 1974: 320, figs. 85-87. - Miyake, 1978: 124. - Miyake, 1982: 133, pl. 44, fig. 6. - Komai et al., 1992: 197.

Material Examined

1♂, SL = 6.35 mm, off Shinminato-shi, 19 Nov. 1991, coll. Isao Wada, TOYA Z91-54-a; 2♂, SL = 6.15-6.90 mm, 1♀, SL = 7.35 mm, 9 ov. ♀, SL = 6.60-7.90 mm, off Shinminato-shi, 19 Nov. 1991, coll. Isao Wada, TOYA Z91-54-b; 1♂, SL = 3.90 mm, off Shinminato-shi, 19 Nov. 1991, coll. Isao Wada, TOYA Z91-54-c; 1♂, SL = 12.20 mm, off Asahi-machi, Toyama-ken, 27 Nov. 1991, coll. NoNu, TOYA Z91-55; 1♀, SL = 7.45 mm, 1 ov. ♀, SL = 9.40 mm, Kurosaki, Nanao-shi, 7 Aug. 1992, coll. NoNu, TOYA Z92-24-a; 1♂, SL = 6.45 mm, Kurosaki, Nanao-shi, 7 Aug. 1992, coll. NoNu, TOYA Z92-24-b; 1♂, SL = 7.80 mm, off Iwase, Toyama-shi, 6 Apr. 1993, coll. Nozomu Miyamoto, TOYA Z93-2-a; 4♂, SL = 4.40-6.05 mm, 2♀, SL = 5.20-6.00 mm, off Iwase, Toyama-shi, 6 Apr. 1993, coll. Nozomu Miyamoto, TOYA Z93-2-b.

Records from the Sea of Japan: Tottori-ken, Sado Island, Niigata-ken, Hokkaido (Yokoya, 1933; Miyake et al., 1962, 1978; Honma and Kitami, 1978), and now Toyama Bay; east coast of Korea (Kim, 1973).

Distribution: Bering Sea, Okhotsk Sea, Gulf of Alaska, Aleutian, Pacific coast of Canada, Washington State; Hokkaido, both Pacific and Sea of Japan coasts of northern Honshu mainland.

Elassochirus gilli (Benedict, 1892)

Eupagurus (Elassochirus) gilli Benedict, 1892: 20.

Pagurus gilli - Rathbun, 1904. - Makarov, 1962: 166, fig. 68a, pl. 3, fig. 1.

Eupagurus cavimanus - Balss, 1913: 58, fig. 34. [Not *Eupagurus cavimanus* Miers, 1879]

Pagurus cavimanus - Makarov, 1962: 147. [Not *Pagurus cavimanus* Miers, 1879]

Elassochirus gilli - McLaughlin, 1974: 330, figs. 88-90.

Records from the Sea of Japan: Soviet Harbor, continental coasts of the Sea of Japan (McLaughlin, 1974).

Distribution: Bering Sea, Okhotsk Sea, Alaska, Aleutian, Kamchatka, Sea of Japan, Puget Sound (Washington State) (McLaughlin, 1974).

Labidochirus splendescens (Owen, 1839)

Pagurus splendescens Owen, 1839: 81, pl. 25, figs. 1, 1a. - Rathbun, 1904: 161. - Makarov, 1962: 187, pl. 4, fig. 2.

Pagurus (Eupagurus) splendescens - Brandt, 1851: 111.

Eupagurus splendescens - Stimpson, 1858: 237. - Alcock, 1905a: 178. - Balss, 1913: 62, figs. 36, 37, pl. 2, fig. 2.

Eupagurus (Labidochirus) splendescens - Benedict, 1892: 2.

Labidochirus splendescens - McLaughlin, 1974: 342, figs. 91-95. - Miyake, 1978: 125, text-fig. 49. - Komai et al., 1992: 197.

Records from the Sea of Japan: Sea of Japan (McLaughlin, 1974).

Distribution: Arctic Ocean, Okhotsk, Sakhalin, Kuril Islands, Bering Sea, Commander Islands, Gulf of Alaska, Puget Sound (Washington State); northern Hokkaido (McLaughlin, 1974; Miyake, 1978).

Labidochirus anomalous (Balss, 1913)

Figs. 62, 63

Eupagurus anomalous Balss, 1913: 53, fig. 32. - Yokoya, 1933: 80. - Makarov, 1962: 185, pl. 4, fig. 5.

Pagurus anomalous - Miyake et al., 1962: 125. - Kim, 1973: 230, text-fig. 53, pl. 6, fig. 33. - Honma & Kitami, 1978: 43.

Labidochirus anomalous - McLaughlin, 1974: 341, 342 (key). - Miyake, 1978: 125. - Miyake, 1982: 120, pl. 41, fig. 1. - Komai et al., 1992: 197.

Material Examined

1♂, SL = 17.45 mm, Ishikawa-ken, KMNH Cat No. 16801; 6♂, SL = 10.20-13.45 mm, 4♀, 10.35-11.35 mm, 1 ov.♀, SL = 11.55 mm, off Aziro, Tottori-ken, 13 Mar. 1963, coll. Takashi Kishida, KMNH Cat. No. 9371.

Records from the Sea of Japan: North of Sado Island (Yokoya, 1933); Iki Island (Nagasaki-ken), Tottori-ken, Ishikawa-ken, and Niigata-ken (Miyake et al., 1962; Miyake, 1982); east coast of Korea (Kim, 1973, as *Pagurus cavi-manus*); Russian coast (Makarov, 1962).

Distribution: Russian coast from De Kastri Gulf southward to Furuhelm Island; east coast of Korea; in Japan, southern Hokkaido southward to Nagasaki along Sea of Japan coast.

Pylopaguropsis zebra (Henderson, 1893)

Eupagurus zebra Henderson, 1893: 425, pl. 39, figs. 12-15. - Balss, 1912: 22.

Pagurus zebra - Miyake, 1975: 260, pl. 116, fig. 2. - Miyake, 1978: 108, fig. 43. - Miyake, 1982: 225.

Pylopaguropsis zebra - McLaughlin & Haig, 1989: 143, figs. 3b, 5b, 7b, 9b, 11b, 13b. - Asakura, 2000: 74, figs. 2, 3. - Asakura, 2002: 453, 454.

Record from the Sea of Japan: Off Tsutsuzaki, Tsushima Islands (Miyake, 1978; Asakura, 2000).

Distribution: Holothria Bank, Australia; Agulhas Bank, Africa; Andamans; Sagami Bay, Kii Peninsula, Tosa Bay, Tsushima Islands.

Discorsopagurus maclaughlinae Komai, 1995

Fig. 64

Orthopagurus schmitti - Makarov, 1962: 217, pl. 2, fig. 1. [Not *Pylopagurus schmitti* Stevens, 1925]

Discorsopagurus schmitti - McLaughlin, 1974: 354 (part). - Takeda & Miyauchi, 1992: 144, fig. 2.

Discorsopagurus maclaughlinae Komai, 1995: 618, figs. 1-4.

Material Examined

1♂, SL = 4.75 mm, 2♀, SL = 3.45 - 3.75 mm, St. 19, 92 m, Sudzukhe Bay, Khabarovsk, Russian coast of Sea of Japan, identified as *Orthopagurus schmitti* by W.W. Makarov, Cat. no. 1942, acc. no. 137749, USNM 72366.

Record from the Sea of Japan: Russian coast of the Sea of Japan.

Distribution: Sakhalin, southern Kuril Islands, Hokkaido, Sea of Japan (Komai, 1995).

Porcellanopagurus nihonkaiensis Takeda, 1985

Fig. 65

Porcellanopagurus nihonkaiensis Takeda, 1985: 141, figs. 1B, 2.

Porcellanopagurus japonicus - Miyake, 1978: 118 (part). [Not *Porcellanopagurus japonicus* Balss, 1913]

Material Examined

1♀, SL = 1.95 mm, 10 m, off Sone, Munakata-oshima Island, Fukuoka-ken, 11 Oct. 1958, coll. Yoshinori Motomatsu, ZLKU (KMNH) Cat no. 7028.

Remarks: Miyake (1978) reported *Porcellanopagurus japonicus* from various localities of Japan. I reexamined one of Miyake's material collected from Fukuoka-ken, Sea of Japan coast, and found it is actually *P. nihonkaiensis*.

Record from the Sea of Japan: Iida Bay, east of Noto Peninsula (Takeda, 1985), and now Munakata-oshima Island, Genkai-nada, Fukuoka-ken.

Distribution: Noto Peninsula and Fukuoka-ken.

Porcellanopagurus japonicus Balss, 1913

Porcellanopagurus japonicus Balss, 1913: 66, fig. 40. - Miyake, 1960: 89, pl. 44, fig. 87. - Miyake, 1965: 649, fig. 1100. - Miyake, 1978: 118 (part), pl. 4, fig. 1.

Remarks: As wrote above, the record of this species from the Sea of Japan is somewhat suspicious. However, I could not locate all of the specimens collected from the Sea of Japan reported by Miyake (1978) as *Porcellanopagurus japonicus*. So, the record of *P. japonicus* is tentatively placed here.

Records from the Sea of Japan: Munakata-oshima Island in Genkai-Nada (Fukuoka-ken)(Miyake, 1978).

Distribution: Sagami Bay, Tosa Bay, Genkai-Nada, Amakusa-Nada, East China Sea.

Anapagurus japonicus Ortmann, 1892

Figs. 66, 67

Anapagurus pusillus var. *japonica* Ortmann, 1892: 296, pl. 12, fig. 11.

Anapagurus japonicus - Miyake, 1961a: 24. - Miyake, 1965: 648, fig. 1099. - Miyake et al., 1962: 126. - Miyake, 1978: 139, text-fig. 55. - Miyake & Imafuku, 1980: 63. - Garcia-Goméz, 1994: 44, figs. 10-11. - Komai et al., 2002: 48, fig. 12.

Material Examined

2♂, SL = 1.85 - 2.00 mm, 36-41 m, sandy and muddy bottom, Sea of Genkai, off Tsuyazaki, Fukuoka-ken, 19 May 1961 - 23 June 1961, coll. T. Kikuchi, A. Taki, and Y. Ono, ZLKU (KMNH) Cat no. 9214-9288.

Record from the Sea of Japan: Off Tsuyazaki (Sea of Genkai, Fukuoka-ken), off Hagi (Yamaguchi-ken) (Miyake, 1978; Komai et al., 2002).

Distribution: Uraga Channel, Fukuoka-ken, Yamaguchi-ken (Garcia-Goméz, 1994; Komai et al., 2002).

Catapaguroides japonicus de Saint Laurent, 1968

Catapaguroides japonicus de Saint Laurent, 1968: 952, figs. 8, 15, 32. - Miyake, 1978: 136 - Miyake, 1982: 198 (list), 230 (key). - Komai et al., 2002: table 1, 49, figs. 13-16.

Record from the Sea of Japan: Off Hagi (Yamaguchi-ken) (Komai et al., 2002).

Distribution: Suruga Bay, Sagami Bay, and Yamaguchi-ken (Miyake, 1978; Komai et al., 2002).

Nematopagurus tricarinatus (Stimpson, 1858)

Fig. 68

Eupagurus tricarinatus Stimpson, 1858: 251. - Stimpson, 1907: 228. - Ortmann, 1892: 309. - Terao, 1913: 372.

Nematopagurus indicus : Miyake, 1961a: 12. - Miyake et al., 1962: 126. [Not *Nematopagurus indicus* Alcock, 1905a]

Nematopagurus vallatus - Miyake, 1978: 131, text-fig. 52. - Miyake & Imafuku, 1980: 63, pl. 2, fig. 8 - Miyake, 1982: 121, pl. 41, fig. 4. [Not *Nematopagurus vallatus* Melin, 1939]

Nematopagurus tricarinatus - McLaughlin and Sandberg, 1995: 579. - McLaughlin, 2004: 182, fig. 11.

Material Examined

1♂, SL = 1.85 mm, 36 m, muddy sand bottom, Sea of Genkai, off Tsuyazaki, Fukuoka-ken, 9 May 1961, coll. T. Kikuchi, Y. Ono, and A. Taki, ZLKU (KMNH) Cat no. 9294 (both chelipeds, both second pereopods and right third pereopod missing).

Records from the Sea of Japan: Tsuyazaki (Fukuoka-ken) (Miyake, 1978).

Distribution: Taiwan, South China Sea, Indonesia; Kagoshima, Amakusa, Tosa Bay, Sagami Bay, Fukuoka-ken and East Chine Sea (McLaughlin, 2004; Miyake, 1978).

Spiropagurus spiriger Ortmann, 1892

Figs. 69, 70

Pagurus spiriger De Haan, 1849: 206, pl. 49, fig. 2.

Spiropagurus spiriger - Stimpson, 1858: 248. - Ortmann, 1892: 297. - Stimpson, 1907: 214. - Balss, 1913: 65. - Terao, 1913: 386. - Kikuchi, 1932: 8. - Yokoya, 1933: 91. - Miyake, 1960: 90, pl. 45, fig. 3. - Miyake, 1961a: 12. - Miyake, 1961b: 169. - Miyake et al., 1962: 126. - Miyake, 1965: 648, fig. 1098. - Miyake, 1978: 137, text-fig. 54. - Miyake & Imafuku, 1980: 63. - Miyake, 1982: 122, pl. 41, fig. 5. - Baba, in Baba, Hayashi & Toriyama, 1986: 210, 211, 306, fig. 155.

Material Examined

1 ov. ♀, SL = 9.55 mm, off Hamakurozaki, 2 Aug. 1979, coll. Toyama Pref. Fish Res. Center, TOYA Z80-189-b; 1♂, SL = 5.10 mm, Hamakurozaki, Toyama-shi, 10 Aug. 1979, coll. Toyama Pref. Fish Res. Center, TOYA Z80-189-c; 1♀, SL = 4.05 mm, Ao, Himi-shi, 11 Sept. 1979, coll. Toyama Pref. Fish Res. Center, TOYA Z80-189-d; 1♂, SL = 6.10 mm, Amaharashi, Takaoka-shi, 7 June 1981, coll. NoNu, TOYA Z81-13; 1♂, SL = 7.90 mm, off Iwase, Toyama-shi, 8 July 1991, coll. Nozomu Miyamoto, TOYA Z90-30; 20♂, SL = 3.95-5.10 mm, 5♀, SL = 3.20-6.00 mm, Amaharashi, Takaoka-shi, 2 Aug. 1990, coll. Hisao Nambu, TOYA Z90-34-a; 1♂, SL = 4.90 mm, Amaharashi, Takaoka-shi, 2 Aug. 1990, coll. Hisao Nambu, TOYA Z90-34-b; 2♂, SL = 3.50-4.90 mm, Amaharashi, Takaoka-shi, 2 Aug. 1990, coll. Hisao Nambu, TOYA Z90-34-c; 2 juv♂, SL = 2.00-2.10 mm, 1♀, SL = 2.60 mm, Yachigasaki, Notozima-machi, Ishikawa-ken, 24 July 1990, coll. Hisao Nambu, TOYA Z90-36; 2♀, SL = 4.05-4.60 mm, Enomekatsuozaki, Notozima-machi, Ishikawa-ken, 30 July 1990, coll. Hisao Nambu, TOYA Z90-39; 2♂, SL = 7.40-10.20 mm, 1♀, SL = 7.60 mm, 1 ov. ♀, SL = 5.10 mm, off Mizuhashi, Toyama-shi, 8 Dec. 1990, coll. Nozomu Miyamoto, TOYA Z90-59; 7♂, SL = 5.05-9.70 mm, 1♀, SL = 6.20 mm, 2 ov. ♀, SL = 7.55-7.90 mm, off Mizuhashi, Toyama-shi, 16 Dec. 1990, coll. Nozomu Miyamoto, TOYA Z90-61; 4♂, SL = 7.65-13.65 mm, off Iwase, Toyama-shi, 26 Mar. 1991, coll. Nozomu Miyamoto, TOYA Z91-2; 2♀, SL = 5.05-6.30 mm, off Iwase, Toyama-shi, 7 June 1990, coll. Nozomu Miyamoto, TOYA Z90-19-c; 1♂, SL = 6.50, off Iwase, Toyama-shi, 9 June 1990, coll. Nozomu Miyamoto, TOYA Z90-21-a; 1♀, SL = 8.00 mm, off Iwase, Toyama-shi, 9 June 1990, Nozomu Miyamoto, TOYA Z90-21-b; 1♂, SL = 7.30 mm, 1 ov. ♀, SL = 9.30 mm, Odajyukuno, Miyazu-shi, Kyoto-fu, Wakasa Bay, late Aug. 2003, coll. H. Motoh (No. 7), gill net, CBM-ZC 8452.

Records from the Sea of Japan: Tsuyazaki (Fukuoka-ken), Tottori-ken, and Toyama-ken (Miyake et al., 1962).

Distribution: Hong Kong, Bay of Bengal, East Indian Archipelago, northern Australia; From Kyushu northward to Toyama Bay (Sea of Japan coast) or Tokyo Bay (Pacific coast) .

Turleania similis Komai, 1999

Turleania similis Komai, 1999: 50, figs. 27-31. - Komai et al., 2002: 56.

Record from the Sea of Japan: South of Iki Island (Komai et al., 2002).

Distribution: Ogasawara Islands and Iki Island (Komai, 1999; Komai et al., 2002).

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- Alcock, A. 1905a. Anomura. Fasc. I. Pagurides. Catalogue of the Indian decapod Crustacea in the collection of the Indian Museum, Calcutta, Part 2: i-xi, 1-197, pls. 1-16.
- Alcock, A. 1905b. Marine Crustaceans. XIV. Paguridae. In: Gardiner, J. S. (ed.), The fauna and geography of the Mal-dive and Laccadive Archipelagoes. Being an account of the work carried on and the collections made by an expedition during the years 1899 and 1900, 2: 827-835. University Press, Cambridge.
- Asakura, A. 1991. A new hermit crab (Decapoda: Paguridae) from rocky shores of the Ogasawara (Bonin) Islands. *Proc. Biol. Soc. Wash.*, 104: 793-799.
- Asakura, A. 1995. Infraorder Anomura. In: Nishimura, S. (ed.), Guide to the seashore animals of Japan wit color pictures and keys. Volume 2. Hoikusha, Osaka, 663 pp. + 144 pls. (In Japanese)
- Asakura, A. 2000. A review of Japanese species of *Pylopagropsis* Alcock, 1905 (Decapoda: Anomura: Paguridae). *Crust. Res.*, 29: 70-108 2000 .
- Asakura, A. 2002. Recent topics on taxonomy of hermit crabs from Japanese waters — Family Paguridae. *Aquabiology (Kaiyo-to-seibutsu)*, 142: 449-456. (In Japanese)
- Asakura, A. 2003. Recent topics on taxonomy of hermit crabs from Japanese waters — Family Paguridae, Part III. *Aquabiology (Kaiyo-to-seibutsu)*, 145: 140-144. (In Japanese)
- Baba, K. 1986. Decapod crustaceans from continental shelf and slope around Japan. The intensive research of unexploited fishery resources on continental slopes (K. Baba, K.-I. Hayashi & M. Toriyama). Japan Fish. Res. Conserv. Ass., Tokyo, 336 pp.
- Balss, H. 1911. Neue Paguriden aus den Ausbeuten der deutschen Tiefsee-Expedition „Valdivia“ und der japanischen Expedition Prof. Dofleins. *Zool. Anz.*, 38: 1-9, text-figs. 1-17.
- Balss, H. 1912. Paguriden. In: Wissenschaftliche Ergebnisse der deutschen Tiefsee-Expedition auf dem Dampfer „Validvia“ 1898-1899, 20, pp. 85-124, text-figs. 1-27, pls. 7-11.
- Balss, H. 1913. Ostasiatische Decapoden. I. Die Galatheiden und Paguriden. In: Beitrage zur Naturgeschite Ostasiens, herausgegeben von Dr. F. Doflein. *Abh. Bayer. Akad. Wiss., math.-phys. Kl., Suppl.*, 2 (9) : 1-85, text-figs. 1-56, pls. 1, 2.
- Bate, C. 1888. Report on the Crustacea Macrura collected by H. M. S. Challenger during the Years 1873-76. *Rep. Voy. Challenger, Zool.*, 24 : i-xc, 1-942, text-figs. 1-76, pls. 1-150.
- Benedict, J. E. 1892. Preliminary descriptions of thirty-seven new species of hermit crabs of the genus *Eupagurus* in the U. S. National Museum. *Proc. U. S. nat. Mus.*, 15 : 1-26.
- Berthold, A. A. 1845. Ueber verschiedene neue oder seltene Reptilien aus New Granada und Crustaceen aus China. *Nach. Gesell. Wissen. Göttingen*, 1845: 37-49.
- Brandt, F. 1851. Krebse. In: A. T. von Middendorffs Reise in den aussersten Norden und Osten Sibiriens während der Jahre 1843 und 1844, 2 (Zoologie), pp. 77-162, pls. 5, 6.
- Dana, J. D. 1852. Crustacea. In : United States Exploring Expedition during the years 1838-1842, under the command of Chales Wilkes, U. S. N., 13, pp. 1-685.
- Doflein, F. 1902. Ostasiatische Dekapoden. *Abh. Bayer. Akad. Wiss., II. Cl.*, 21 (3) : 613-670, pls. 1-6.
- Fabricius, J. C. 1787. Manitissa insectorum sistens eorum species nuper detectas adjectis characteribus genericis, differentiis specificis, emendationibus, observationibus, 1, xx + 348 pp. Hafniae.
- Forest, J. 1956. Les Pagures du Viet-Nam. I. Le genre *Diogenes* Dana. *Bull. Mus. nat. d'Hist. natur.*, (2), 28: 524-532.
- Forest, J. 1984. Révision du genre *Aniculus*. *Crustaceana, Suppl.*, 8: 1-91.
- Forest, J. 1987. Les Pylochelidae ou “Pagures symétriques” (Crustaces Coenobitoidea). In: Résultats des Campagnes MUSORSTOM 3. *Mém. Mus. nat. d'Hist. natur. A, Zool.*, 137: 1-254, pls. 1-9.

- Forest, J., & P. A. McLaughlin. 1998. Descriptions of two new Japanese hermit crabs (Decapoda: Paguridae [sic]: Diogenidae) hitherto mistakenly identified. *Proc. Biol. Soc. Wash.*, 111: 188-198.
- Gracia-Gómez, J. 1994. The systematics of the genus *Anapagurus* Henderson, 1886, and a new genus for *Anapagurus drachi* Forest, 1966 (Crustacea: Decapoda: Paguridae). *Zool. Verh., Leiden*, 295: 1-131, figs. 1-44.
- Grant, F. E., & A. R. McCulloch. 1906. On a collection of Crustacea from the Port Curtis distinct, Queensland. *Proc. Linn. Soc. New South Wales*, 1906: 1-53.
- Haan, W. De, 1833-1850. Crustacea. In : P. F. De Siebold, Fauna Japonica, i-xxxii, pp. 1-224, pls. 1-55, A-Q, 1, 2.
- Haig, J., & E. E. Ball. 1988. Hermit crabs from northern Australian and eastern Indonesian waters (Crustacea: Decapoda: Anomura: Paguroidea) collected during the 1975 Alpha Helix Expedition. *Rec. Aust. Mus.*, 40: 151-196.
- Heller, C. 1862. Neue Crustaceen gesammelt wahlend der Weltumsegelung der K. K. Fregatte „Novara“. Zweiter vorlaufiger Bericht. *Verh. Zoo.-bot. Ges. Wien*, 28 : 519-528.
- Henderson, J. R. 1888. Report on the Anomura collected by H. M. S. Challenger during the years 1873-76. *Sci. Rep. Challenger Exped.*, (Zool.), 27 : i-xi, 1-221, pls. 1-21.
- Henderson, J. R. 1893. A contribution to Indian Carcinology. *Trans. Linn. Soc. London Zool.*, ser. 2, 5: 325-458, pls. 36-40.
- Herbst, J. F. W. 1791-96. Versuch einer Naturgeschichte der Krabben und Krebse nebst einer systematischen Beschreibung ihrer verschiedenen Arten. 2: i-viii, 1-226. Gottlieb August Lange, Berlin und Stralsund.
- Herbst, J. F. W. 1804. Versuch einer Naturgeschichte der Krabben und Krebse etc. 3: 1-49. Gottlieb August Lange, Berlin und Stralsund.
- Hess, W. 1865. Beiträge zur Kenntnis der Decapoden-Krebse Ost-Australiens. Druck von Carl Georgi, Bonn. 47 pp.
- Hilgendorf, F. 1869. Crustaceen. In: C. C. van der Decken, Reisen in Ost-Afrika in den Jahren 1859-1865. 3 (1): pp. 69-116. C. F. Winter'sche Verlagshandlung, Leipzig, Heidelberg.
- Holthuis, L. B., & T. Sakai. 1970. Ph. F. Von Siebold and Fauna Japonica. A history of early Japanese zoology. Acad. Press Japan : i-viii, 1-323, pls. 1-32.
- Honma, Y., & T. Kitami. 1978. Fauna and flora in the waters adjacent to the Sado Marine Biological Station, Niigata University. *Ann. Rep. Sado Mar. Biol. Stat., Niigata Univ.*, 8: 7-81.
- Igarashi, T. 1970. A list of marine decapod crustaceans from Hokkaido, deposited at the Fisheries Museum, Faculty of Fisheries, Hokkaido University. II. Anomura. *Fish. Mus., Fac. Fish. Hokkaido Univ., Contr.*, 12: 1-15. pls. 1-9.
- Kamita, T. 1941-1958. Studies on the decapod crustaceans of Corea. Part 2, Hermit crabs. 1-5. *Sci. Rep. Shimane Univ.*, 1, (4) : 57-70, 1941 ; 2, (5) : 29-48, 1955; 3, (6) : 58-76, 1956; 4, (7) : 91-109, 1957; 5, (8) : 59-75, 1958 ; text-figs.1-17. (In Japanese)
- Kikuchi, K. 1932. Decapod crustaceans of Toyama Bay. *Toyama Kyoiku*, 227: 1-23. (In Japanese)
- Kikuchi, K. 1959. Decapod crustaceans of Sado Island and adjacent waters. *Bull. Biol. Soc. Hiroshima Univ.*, 10: 49-51.
- Kim, H. S. 1964. A study on the geographical distribution of Anomura decapods of Korea, with consideration of its oceanographic conditions. *Jour. Sung Kyun Kwan Univ. Suppl.*, 8: 1-15, pl. 1.
- Kim, H. S. 1970. A checklist of the Anomura and Brachyura (Crustacea, Decapoda) of Korea. *Jour. Seoul Nat. Univ., Biol. Agric. ser. B*, 21 : 1-29, pls. 1-5.
- Kim, H. S. 1973. Anomura and Brachyura. In : Illustrated encyclopedia of fauna and flora of Korea, 14 : 1-694, text-figs. 1-265, pls. 1-112.
- Komai, T. 1994. Record of a pagurid hermit crab, *Pagurus undosus* (Benedict, 1892)(Crustacea: Decapoda: Anomura) from Hokkaido, Japan. *Proc. Jpn. Soc. Syst. Zool.*, 50: 24-27.
- Komai, T. 1995. A new species of the genus *Discorsopagurus* (Crustacea : Decapoda : Paguridae) from Japan, previously known as *D. schmitti* (Stevens). *Proc. Biol. Soc. Wash.*, 108 (4) : 617-628.

- Komai, T. 1996. *Pagurus nigrofascia*, a new species of hermit crab (Decapoda: Anomura: Paguridae) from Japan. *Crust. Res.*, 25:86-92.
- Komai, T. 1998. The taxonomic position of *Pagurus gracilipes* (Stimpson, 1858) and *Pagurus nipponensis* (Yokoya, 1933), and description of a new species of *Pagurus* (Decapoda, Anomura, Paguridae) from Japan. *Zoosystema*, 20: 265-288.
- Komai, T. 1999. Hermit crabs of the families Diogenidae and Paguridae (Crustacea: Decapoda: Anomura) collected during the Shin'yo-maru cruise to the Ogasawara Islands and Torishima Island, oceanic islands in Japan. *Nat. Hist. Res., Special Issue*, 6: 1-66.
- Komai, T. 2000a. Redescription of *Pagurus pectinatus* (Crustacea: Decapoda: Anomura: Paguridae). In: Komai, T. (ed.), Results of Recent Research on Northeast Asian Biota, *Nat. Hist. Res., Special Issue*, 7: 323-337.
- Komai, T. 2000b. The identity of *Pagurus brachiomastus* and descriptions of two new species of *Pagurus* (Crustacea: Decapoda: Anomura: Paguridae) from the northwestern Pacific. *Spec. Div.*, 5: 229-265.
- Komai, T. 2001. A review of the north-western Pacific species of the genus *Paguristes* (Decapoda : Anomura : Diogenidae), I. Five species initially reported by Ortmann (1892) from Japan. *Jour. Nat. Hist.*, 35, 357-428.
- Komai, T. 2003. Identities of *Pagurus japonicus* (Stimpson, 1858) and *P. similis* (Ortmann, 1892), with description of a new species of *Pagurus*. *Zoosystema*, 25: 377-411.
- Komai, T. 2004. Redescription of *Pagurus conformis*, the senior synonym of *P. megalops* (Crustacea : Decapoda: Anomura : Paguridae). *Spec. Div.*, 9,343-358.
- Komai, T., & M. Imafuku. 1996. Redescription of *Pagurus lanuginosus* with the establishment of a neotype, and description of a new closely related species (Decapoda : Anomura : Paguridae). *Jour. Crust. Biol.*, 16: 782-796.
- Komai, T., S. Maruyama, & K. Konishi. 1992. A list of decapod crustaceans from Hokkaido, northern Japan. *Res. Crust.*, 21: 189-205.
- Komai, T., & S. Mishima. 2003. A redescription of *Pagurus minutus* Hess, 1865, a senior synonym of *Pagurus dubius* (Ortmann, 1892) (Crustacea: Decapoda: Anomura: Paguridae). *Benthos Res.*, 58: 15-30.
- Komai, T., S. Ohtsuka, K. Nakaguchi, & A. Go. 2002. Decapod crustaceans collected from the southern part of the Sea of Japan in 2000-2002 using TRV Toyoshio-maru. *Nat. Hist. Res.*, 7: 19-73.
- Krauss, F. 1843. Die Südafrikanischen Crustaceen. Eine Zusammenstellung aller bekannten Malacostraca. Bemerkungen über deren Lebensweise und geographische Verbreitung, nebst Beschreibung und Abbildung mehrerer neuen Arten. E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart. 68 pp.
- Latreille, P. A. 1802. Histoire naturelle, générale et particulière, des Crustacés et des Insectes. Paris, F. Dufart. Vol. 3, 480 pp.
- Linnaeus, C. 1785. Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis locis. (ed. 10) 1: i-ii, pp. 1-824. Holmiae.
- Makarov, V. V. 1938 (1962). Crustacea, Anomura, Fauna SSSR. *Zool. Inst. Akad. Nauk SSSR* (1938), n. ser. 16, 10 (3) : i-x, 1-324, text-figs. 1-113, pls. 1-5. [English translation, (1962). Crustacea, Anomura, Fauna of U. S. S. R. *Zool. Inst. Acad. Sci. U. S. S. R.*, n. ser. 16, 10 (3) : 1-283, text-figs. 1-113, pls. 1-5].
- Man, G. J. de. 1887. Uebersicht der indo-pacifischen Arten der Gattung *Sesarma* Say, nebst einer Kritik der von W. Hess und E. Nauck in den Jahren 1865 und 1880 beschriebene Decapoden. *Zool. Jb. Syst.*, 2: 639-722, figs. 1-3, pl. XVII.
- Matada, M., T. Okamoto, and Y. Yamagishi. 1995. Marine invertebrates in the vicinity of Tsukumo Bay, Noto Peninsula. *Rep. Noto Mar. Cent.*, 1: 31-38.
- McLaughlin, P. A. 1974. The hermit crabs (Crustacea Decapoda, Paguridea) of north-western North America. *Zool. Verh., Leiden*, 130 : 1-396, text-figs. 1-101, pl. 1, 1 map.
- McLaughlin, P. A. 1976. A new Japanese hermit crab (Decapoda, Paguridae) resembling *Pagurus samuelis* (Stimpson).

- Crustaceana*, 30: 13-26, text-figs. 1-5.
- McLaughlin, P. A. 1997. Crustace Decapoda: Hermit crabs of the family Paguridae from the KARUBAR cruise in Indonesia. In: Crosnier, A., & P. Bouchet (eds), *Résultats des Campagnes MUSORTOM*, 16. Mém. Mus. nat. d'Hist. natur., 172: 433-572.
- McLaughlin, P. A. 2000. Crustacea Decapoda: *Porcellanopagurus* Filhol and *Solitariopagurus* Türkay (Paguridae), from the New Caledonian area, Vanuatu and the Marquesas: new record, new species. In: Crosnier, A. (ed.), *Résultats des Campagnes MUSORTOM*, volume 21. Mém. Mus. nat. d'Hist. natur., 184: 389-414. Paris.
- McLaughlin, P. A. 2002a. A review of the Hermit-crab (Decapoda: Anomura: Paguridea) fauna of southern Thailand, with particular emphasis on the Andaman Sea, and descriptions of three new species. *Phuket Mar. Biol. Cent. Spec. Publ.*, 23: 385-460.
- McLaughlin, P. A. 2002b. *Diogenes pallescens* Whitelegge, *D. gardineri* Alcock and *D. serenei* Forest (Decapoda: Anomura: Paguridea: Diogenidae) : distinct species or morphological variants? *Raffles Bull. Zool.*, 50: 81-94.
- McLaughlin, P. A. 2004. A review of the hermit-crab genus *Nematopagurus* A. Milne-Edwards and Bouvier, 1892, and the descriptions of five new species (Crustacea: Decapoda: Paguridae). In: Marshall, B., & B. Richer de Forges (eds), *Tropical Deep-Sea Benthos*, volume 23. Mém. Mus. nat. d'Hist. natur. 191: 151-229. Paris.
- McLaughlin, P. A., & J. Forest. 1997. Crustacea Decapoda: *Diacanthurus* gen. nov., a new genus of hermit crabs (Paguridae) with both recent and fossil representation, and the descriptions of two new species. In: Crosnier, A. (ed.), *Résultats des Campagnes MUSORTOM*, 18. Mém. Muséum nat. d'Hist. natur., 176: 236-259.
- McLaughlin, P. A., & S. W. Gunn. 1992. Revision of *Pylopagurus* and *Tomopagurus* (Crustacea: Decapoda: Paguridae), with the descriptions of new genera and species: Part IV. *Lophopagurus* McLaughlin and *Australeremus* McLaughlin. *Mem. Mus. Victoria*, 53: 43-99, pl. 1.
- McLaughlin, P. A., & J. Haig. 1989. On the status of *Pylopaguropsis zebra* (Henderson), *P. magnimanus* (Henderson), and *Galapagurus teevanus* Boone, with descriptions of seven new species of *Pylopaguropsis* (Crustacea: Anomura: Paguridae). *Micronesica*, 22: 123-171.
- McLaughlin, P. A., & J. Haig. 1996. A redescription of *Diogenes senex* Heller, 1865, sensu stricto (Decapoda: Anomura: Paguridea: Diogenidae). *Pakistan Jour. Mar. Sci.*, 4: 115-126.
- McLaughlin, P. A., & L. Sandberg. 1995. Redescriptions of Gustav Melin's "*Eupagurus (Pagurillus) exiguus*", "*Eupagurus (Catapagurus) vallatus*", and "*Eupagurus (Spiropagurus) facetus*" (Decapoda: Anomura: Paguridae) based on the type material. *Jour. Crust. Biol.*, 15: 569-587.
- Melin, G. 1939. Paguriden und Galatheiden von Prof. Dr. Sixten Bocks Expedition nach den Bonin-Inseln 1914. *K. svenska Vetensk. Akad. Handl., Stockholm*, ser. 3, 18: 1-119, text-figs. 1-71.
- Miers, E. J. 1878 (1879). Revision of Crustacea in the Corean and Japanese Seas. *Proc. Zool. Soc. London*, 1879 : 18-61, pls. 1-3.
- Milne Edwards, H. 1836. Observations zoologiques sur les Pagures et description d'un nouveau genre de la trib des Paguriens. *Ann. Sci. nat. Paris, Zool.*, ser. 2, 6 : 257-288, pls. 13, 14.
- Milne Edwards, H. 1848. Note sur quelques nouvelles especies du genre Pagure. *Ann. Sci. nat. Paris, Zool.*, ser. 3, 10 : 59-64.
- Mishima, S. 1997. A new record of a hermit crab, *Pagurus nigrofascia* Komai, 1996, from Wajiro-higata tidalland in Fukuoka, Japan. *Cancer*, 6: 19-21. (In Japanese)
- Mishima, S. 1998. On a hermit crab, *Pagurus nigrofascia* Komai, 1996, of Fukuoka, Japan. *Cancer*, 7: 9-11. (In Japanese)
- Mishima, S. 2003. Life history and biogeographical distribution of *Pagurus nigrofascia* Komai. *Biol. Sci. News*, 379: 14-16. (In Japanese)
- Miyake, S. 1956. Invertebrate fauna of the intertidal zone of the Tokara Islands, XIII. Anomura. *Publ. Seto Mar. Biol.*

- Lab.*, 5: 303-337, test-fig. 1-23.
- Miyake, S. 1960. Anomura. Encyclopaedia Zoologica, illustrated in colours. Hokuryukan, Tokyo, 4: 89-97, pls. 44-48 (In Japanese).
- Miyake, S. 1961a. Decapod Crustacea. *Fauna and Flora of the Sea around the Amakusa Mar. Biol. Lab.*, 2: i-iv, 1-30. (In Japanese).
- Miyake, S. 1961b. A list of the decapod Crustacea of the Sea of Ariake, Kyushu. *Rec. oceanogr. Works Jpn., Spec. No.*, 5: 165-178.
- Miyake, S. 1961c. Three new species of Anomura from Japan (Decapoda, Crustacea). *Jour. Fac. Agric., Kyushu Univ.*, 11: 237-247, text-figs 1-6.
- Miyake, S. 1965. Anomura. In: New illustrated encyclopedia of the fauna of Japan. Hokuryukan, Tokyo, (2): 630-652, Figs. 1032-1115. (In Japanese)
- Miyake, S. 1975. Anomura. In: Utinomi, F. (ed.), Freshwater and marine animals. Gakusyu-kenkyusha, Tokyo: 187-342, pls. 110-119. (In Japanese)
- Miyake, S. 1978. The crustacean Anomura of Sagami Bay. Biological Laboratory, Imperial Household, Tokyo, 200 pp., 4 pls.
- Miyake, S. 1982. Japanese crustacean decapods and stomatopods in color. I. Macrura, Anomura and Stomatopoda. Hoikusha Publ. Comp., Osaka, 261 pp. (In Japanese)
- Miyake, S. 1998. Japanese crustacean decapods and stomatopods in color. I. Macrura, Anomura and Stomatopoda (Third print). Hoikusha Publ. Comp., Osaka, 261 pp. (In Japanese)
- Miyake, S., & M. Imafuku. 1980. Hermit crabs from the Kii Peninsula. *Nanki-Seibutsu, Nanki Biol. Soc.*, 22: 1-7, 59-64. (In Japanese)
- Miyake, S., K. Sakai, & S. Nishikawa. 1962. A fauna-list of the decapod Crustacea from the coasts washed by the Tsushima warm current. *Rec. Oceanogr. Works Jpn., Spec. No.*, 6: 121-131.
- Morgan, G. J. 1987. Hermit crabs (Decapoda, Anomura: Coenobitidae, Diogenidae, Paguridae) of Darwin and Port Essington, northern Australia. *Beagle, Rec. N. Territ. Mus. Arts Sci.*, 4: 165-186.
- Motoh, H. (in press) Anomuran Decapoda from Kyoto Prefecture, Sea of Japan. *Rep. Noto Mar. Cent.*
- Nishimura, S. 1965-1969. The zoogeographical aspects of the Japan Sea. Parts I-V. *Publ. Seto Mar. Biol. Lab.*, 13: 35-79, 81-101 (1965), 365-389 (1966); 15: 329-352 (1968); 17: 67-142.
- Ortmann, A. 1892. Die Decapoden-Krebse des Strassburger Museums, mit besonderer Berücksichtigung der von Herrn Dr. Doederlein bei Japan und bei den Liu-Kiu-Inseln gesammelten und zur Zeit im Strassburger Museum aufbewahrten Formen. IV. Theil. Die Abtheilungen Galatheidea und Paguridea. *Zool. Jb. Syst.*, 6 : 241-326, pls. 11, 12.
- Owen, R. 1839. Crustacea. In: Beechey, F. W. (ed.), The zoology of Captain Beechey's voyage; comp. from the collections and notes made by Captain Beechey, the officers and naturalist of the expedition to the Pacific and Behring's straits performed in His Majesty's ship "Blossom", under the command of Captain F. W. Beechey ... in the years 1825, 26, 27 and 28. pp. 77-92. H. G. Bohn, London.
- Rahayu, D. L. 1996. Notes on littoral hermit crabs (excluding Coenobitidae) (Crustacea: Decapoda: Anomura) mainly from Singapore and Peninsular Malaysia. *Raffles Bull. Zool.*, 44: 335-355.
- Rahayu, D. L., & J. Forest. 1993. Le genre *Clibanarius* (Crustacea, Decapoda, Diogenidae) en Indonésie, avec la description de six espèces nouvelles. *Bull. Mus. nat. d'Hist. natur., Paris [1992]* (4), 14(A): 745-779.
- Rahayu, D. L., & J. Forest. 1995. Le genre *Diogenes* (Crustacea, Decapoda, Diogenidae) en Indonésie, avec la description de six espèces nouvelles. *Bull. Mus. nat. d'Hist. natur., Paris [1994]* (4), 16(A): 383-415.
- Rahayu, D. L., & J. Forest. 1999. Sur le statut de *Calcinus gaimardii* (H. Milne Edwards, 1848) (Decapoda, Anomura, Diogenidae) et description de deux espèces nouvelles apparentées. *Zoosystema*, 21: 461-472.
- Rathbun, M. J. 1902. Japanese stalk-eyed crustaceans. *Proc. U. S. nat. Mus.*, 26 : 23-55, text-figs. 1-24.

- Rathbun, M. J. 1904. Decapod crustaceans of the northwest coast of North America. *Harriman Alaska Ser.*, 10 : 1-190, text-figs. 1-95, pls. 1-10.
- Roux, P. 1823-1830. Crustacés de la Méditerranée et de son littoral, décrits et lithographiés. iv, 176 pp., published in 9 parts: 1, 2, 1828; 3, 1829; 4-9, 1830. Paris and Marseille.
- Saint Laurent, M. De. 1968. Revision des genres *Catapaguroides* et *Cestopagurus* et description de quatre generes nouveaux. I. *Catapaguroides* A. Milne Edwards et Bouvier et *Decaphyllus* gen. nov. (Crustaces Decapodes Paguridae). *Bull. Mus. Hist. nat., Paris, ser. 2*, 39 (5) : 923-954 ; 39 (6) : 1100-1119, text-figs. 1-57, 1967 (1968).
- Saint Laurent, M. De, & P. A. McLaughlin. 2000 . Superfamily Paguroidea, family Paguridae. In: Forest, J., M. de Saint-Laurent, P. A. McLaughlin, & R. Lemaitre (eds.), The marine fauna of New Zealand: Paguridea (Decapoda: Anomura) exclusive of the Lithodidae, pp. 104-209, NIWA Biodiv. Mem., 114.
- Sakai, K., & H. Fukushima. 1998. Record of southern hermit crabs, *Calcinus gaimardii* (Diogenidae, Decapoda), at the western Nanao Bay, Noto Peninsula. *Rep. Noto Mar. Cent.*, 4: 1-4.
- Sandberg, L., & P. A. McLaughlin. 1993. Reexamination of *Pagurus minutus* Hess, 1865, and *Pagurus filholi* (de Man, 1887)(Crustacea: Anomura: Paguridae). *Zool. Med. Leiden*, 67 : 197-206.
- Shimoyama, S. 1979. Modification of the paleontological information caused by selective utilization of empty shells by an intertidal hermit crab *Diogenes edwardsi* (De Haan). *Rep. Fish. Res. Lab., Kyushu Univ.*, 4: 65-78. (In Japanese)
- Stevens, B. A. 1925. Hermit crabs of Friday Harbor, Washington. *Publ. Puget Sound Mar. Biol. Sta.*, 3: 273-309.
- Stimpson, W. 1857. On the Crustacea and Echinodermata of the Pacific shores of North America, 1. Crustacea. *Boston J. Nat. Hist.*, 6: 444-532, pls. 18-23.
- Stimpson, W. 1858. Prodromus descriptionis animalium evertebratorum, quae in expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers ducibus, observavit et descripsit. VII. Crustacea Anomura. *Proc. Acad. nat. Sci. Philad.*, 1858: 225-252 (63-90).
- Stimpson, W. 1907. Report on the Crustacea (Brachyura and Anomura) collected by the North Pacific Exploring Expedition, 1853-1856. *Smithson. misc. Coll.*, 49: 1-240, pls. 1-26.
- Suzuki, K. 1971. Decapod crustaceans. In: Nishimura, S., & K. Suzuki (ed.), Common seashore animals of Japan in color, pp. 77-125, pls. 26-46. Hoikusha, Osaka. (In Japanese)
- Takeda, M. 1994. Crustacea. In: Yamakei Field Books 8, Marine animals, pp. 211-284, Yamatokeikoku-sha, Tokyo. (In Japanese)
- Takeda, M. 1995. Occurrence of a new hermit crab of the genus *Porcellanopagurus* in the Sea of Japan. *Mem. Nat. Sci. Mus., Tokyo*, 18: 141-144.
- Takeda, M., & T. Miyauchi. 1992. Anomuran and brachyuran crustaceans from the Soya Strait, northern Hokkaido. *Bull. Nat. Sci. Mus., Tokyo*, 25: 143-153. (In Japanese)
- Tatsu, K. 2002. Arthropoda specimens deposited in the Noto Marine Center, Ishikawa Prefecture. *Rep. Noto Mar. Cent.*, 8: 39-46.
- Terao, A. 1913. A catalogue of hermit-crabs found in Japan, with descriptions of four new species. *Annot. Zool. Jap.*, 8: 355-391, text-figs. 1-4.
- Thallwitz, J. 1891. Decapoden-Studien, insbesondere basirt auf A. B. Meyer's Sammlungen im Ostindischen Archipel, nebst einer Aufzählung der Decapoden und Stomatopoden des Dresdener Museums. *Abh. Ber. K. zool-anthrop. Mus. Dresden*, 1890-1891, 3: 1-55, pl. 1.
- Urita, T. 1942. Decapod crustaceans from Saghalien, Japan. *Bull. Biogeogr. Soc. Japan*, 12: 1-78, text-figs. 1-16.
- Utinomi, H. 1956. Coloured illustrations of sea shore animals, Japan. Hoikusha, Osaka, 167 pp., 64 pls. (In Japanese)
- Whitelegge, T. 1897. The fauna of Funafuti [6.] The Crustacea. *Aust. Mus. Mem.*, 3: 7-151.
- Yajima, T., & M. Yamaguchi. 1983. Ecological distribution of the intertidal hermit crabs and their host shell utilization in the Tsukumo Bay, Noto Peninsula. *Bull. Japan Sea Res. Inst., Kanazawa Univ.*, 15: 1-14. (In Japanese)

- Yamaguchi, T., & K. Baba. 1993. Crustacean specimens collected in Japan by Ph. E. von Siebold and H. Bürger and held by the Nationaal Natuurhistorisch Museum in Leiden and other museums. In: Yamaguchi, T. (ed.), Ph. F. von Siebold and natural history of Japan, Crustacea. Carcinol. Soc. Japan, Tokyo.
- Yamaguchi, T., & K. Baba. 2003. Crustacean specimens collected in Japan by Ph. E. von Siebold and H. Bürger and held by the Nationaal Natuurhistorisch Museum in Leiden and other museums (revised edition). *Calanus, Bull. Aitsu Mar Sta., Kumamoto Univ. Spec. No. 4*: 3-86.
- Yamaguchi, E., & M. Yamada. 1955. Marine invertebrates from northern Japan. Hokkai-Kyoiku-Hyoron-sha, Sapporo, 189 pp. (In Japanese).
- Yokoya, Y. 1933. On the distribution of decapod crustaceans inhabiting the continental shelf around Japan, chiefly based upon the materials collected by S. S. Soyo-Maru, during the year 1923-1930. *Jour. Coll. Agric., Tokyo Imp. Univ.*, 12: 1-226, text-figs. 1-71.
- Yokoya, Y. 1939. Macrura and Anomura of decapod Crustacea found in the neighborhood of Onagawa, Miyagi-ken. *Sci. Rep. Tohoku Imp. Univ., ser. 4*, 14: 261-289, text-figs. 1-13.
- Yu, H. P., & K. Y. Foo. 1990. Hermit-crabs of Taiwan. S. C. Publ. Inc., Taipei. 78 pp.

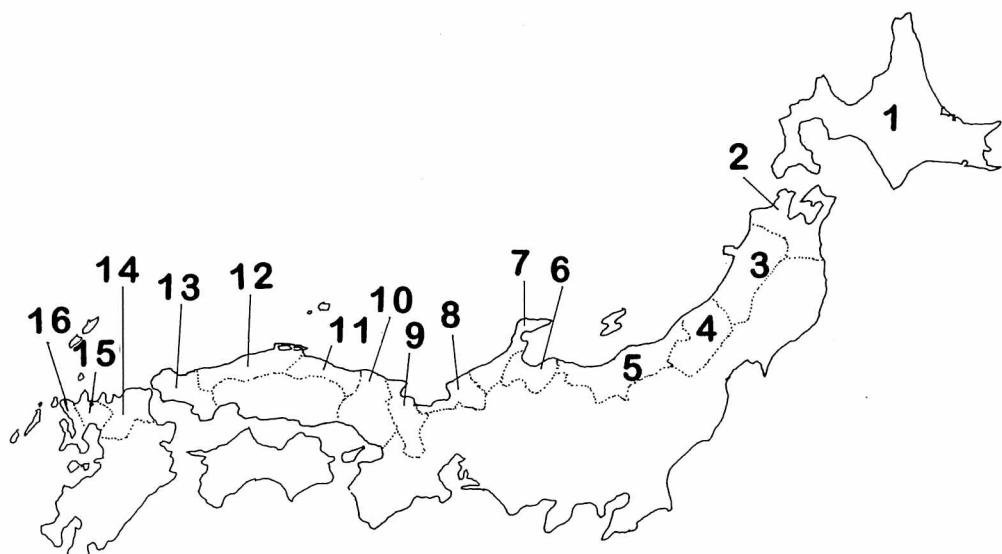
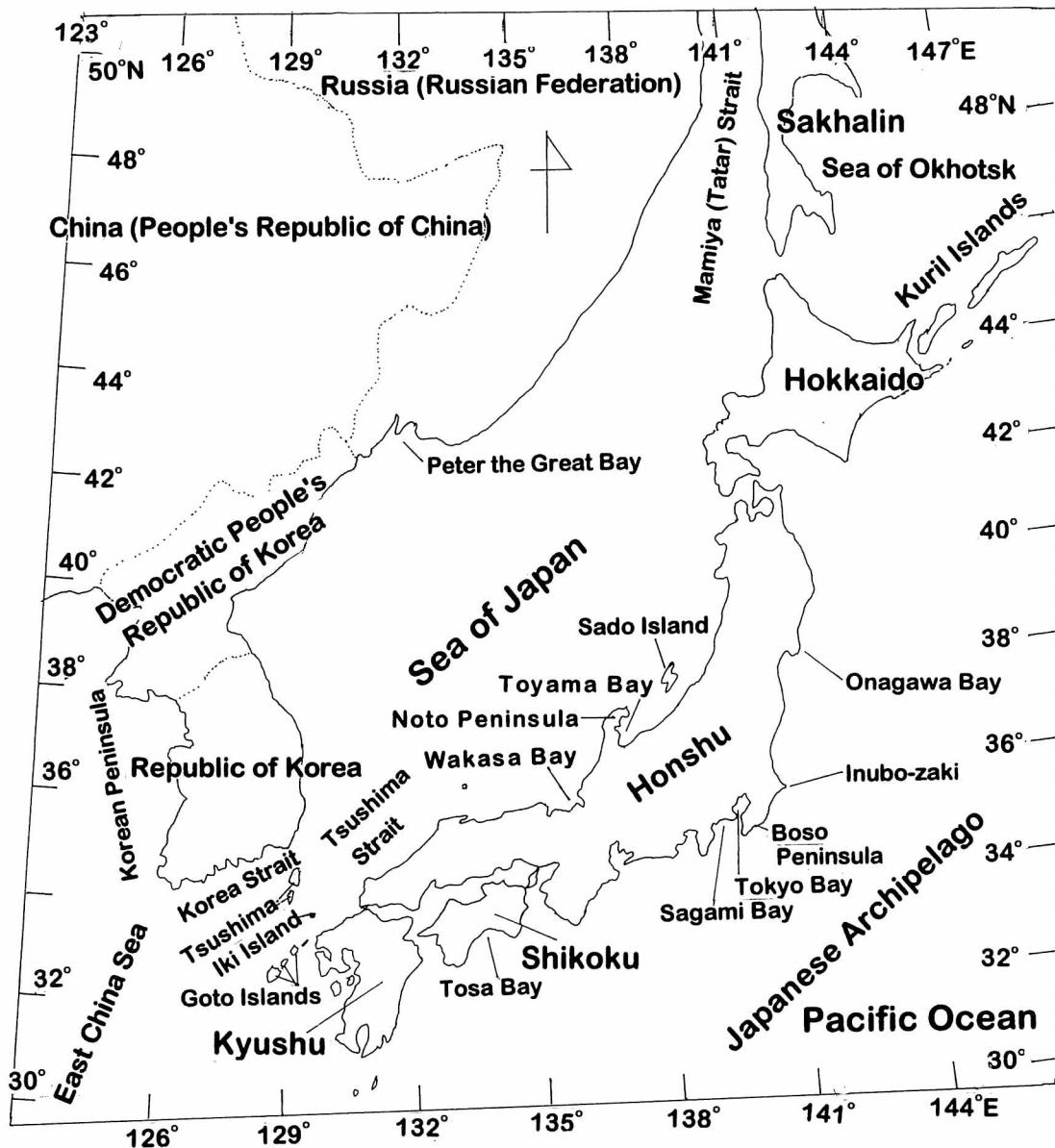


Fig. 1. Maps. Upper: Sea of Japan and its surrounding areas. Lower: Japanese prefectures along coasts of the Sea of Japan: 1, Hokkaido; 2, Aomori-ken; 3, Akita-ken; 4, Yamagata-ken; 5, Niigata-ken; 6, Toyama-ken; 7, Ishikawa-ken; 8, Fukui-ken; 9, Kyoto-fu; 10, Hyogo-ken; 11, Tottori-ken; 12, Shimane-ken; 13, Yamaguchi-ken; 14, Fukuoka-ken; 15, Saga-ken; 16, Nagasaki-ken.

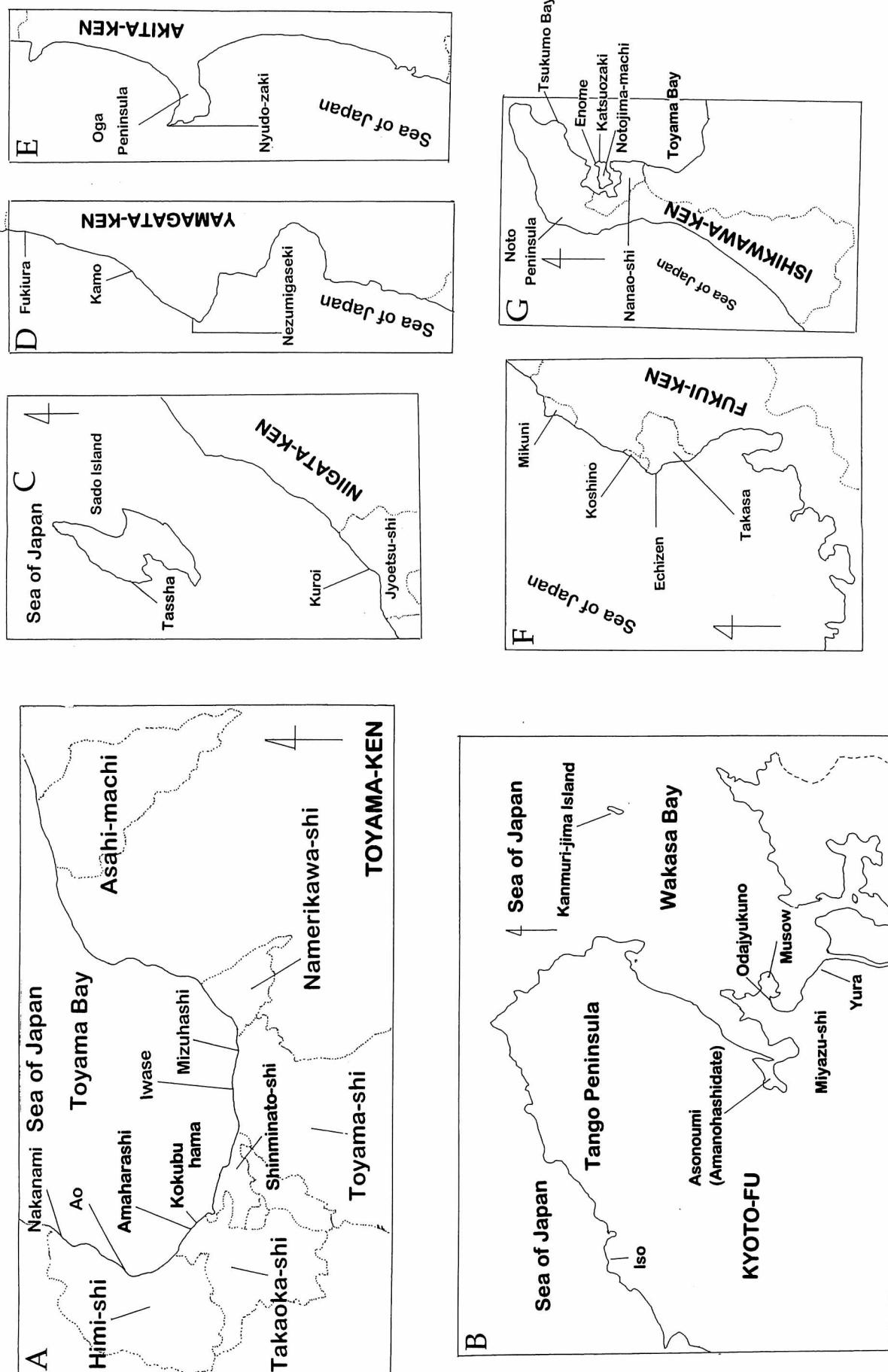


Fig. 2. Maps of selected prefectures along coasts of the Sea of Japan. A, Toyama-ken; B, Kyoto-fu; C, Niigata-ken; D, Yamagata-ken; E, Akita-ken; F, Fukui-ken; G, Ishikawa-ken.

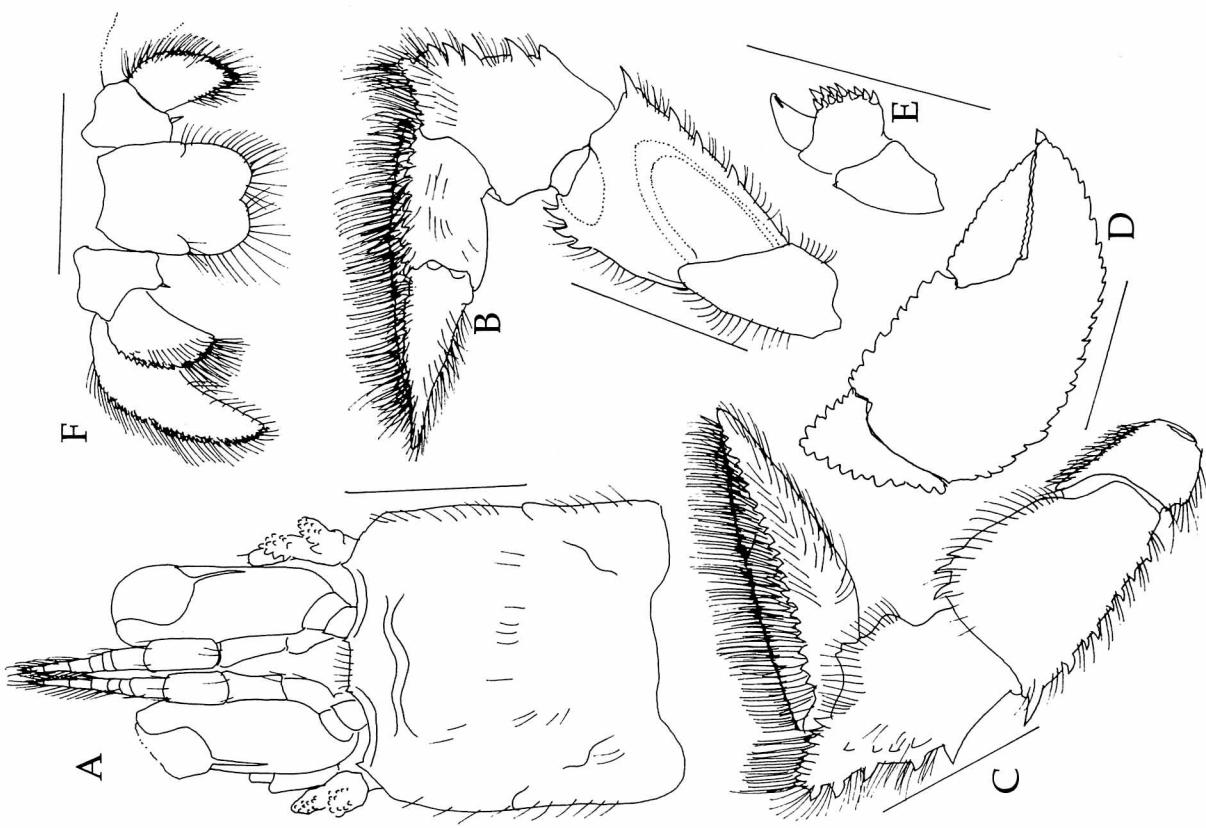


Fig. 3. *Pomatochelus jeffreysii* Miers, 1879; ♂, SL = 1.70 mm, Yosano-gun, Kyoto-fu, OMNH Ar 2808. A, shield and cephalic appendages, dorsal; B, right cheliped, mesial; C, same, lateral; D, same, chela and carpus, dorsal; E, right fourth pereopod, chela and carpus, lateral; F, uropods and telson, dorsal. Setae omitted in D and E. Scales equal 1 mm.

Fig. 4. *Pomatochelus jeffreysii* Miers, 1879; ♂, SL = 1.70 mm, Yosano-gun, Kyoto-fu, Kyoto-fu, OMNH Ar 2808. A, right second pereopod, lateral; B, same, carpus and distal portion of merus, mesial; C, right third pereopod, lateral; D, left third pereopod, lateral; E, same, carpus and distal portion of merus, mesial. Setae omitted in B and E. Scales equal 1 mm.

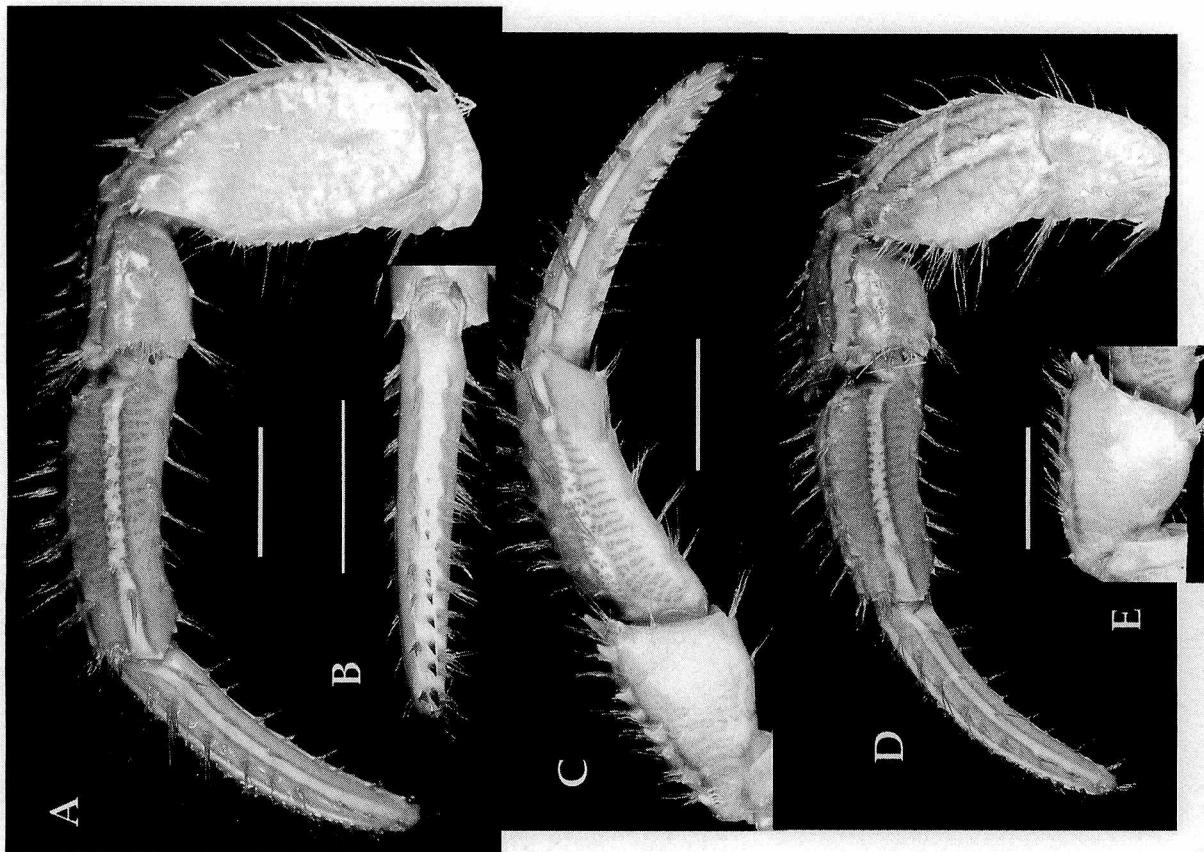


Fig. 6. *Clibanarius infraspinatus* Hilgendorf, 1869: ♂, SL = 12.00 mm, Takaoka-shi, Toyama-ken, TOYA Z81-52-r. A, left second pereopod, lateral; B, same, dactyl, ventral; C, same, dactyl, propodus and carpus, mesial; D, left third pereopod, lateral; E, same, carpus, mesial. Scales equal 5 mm.

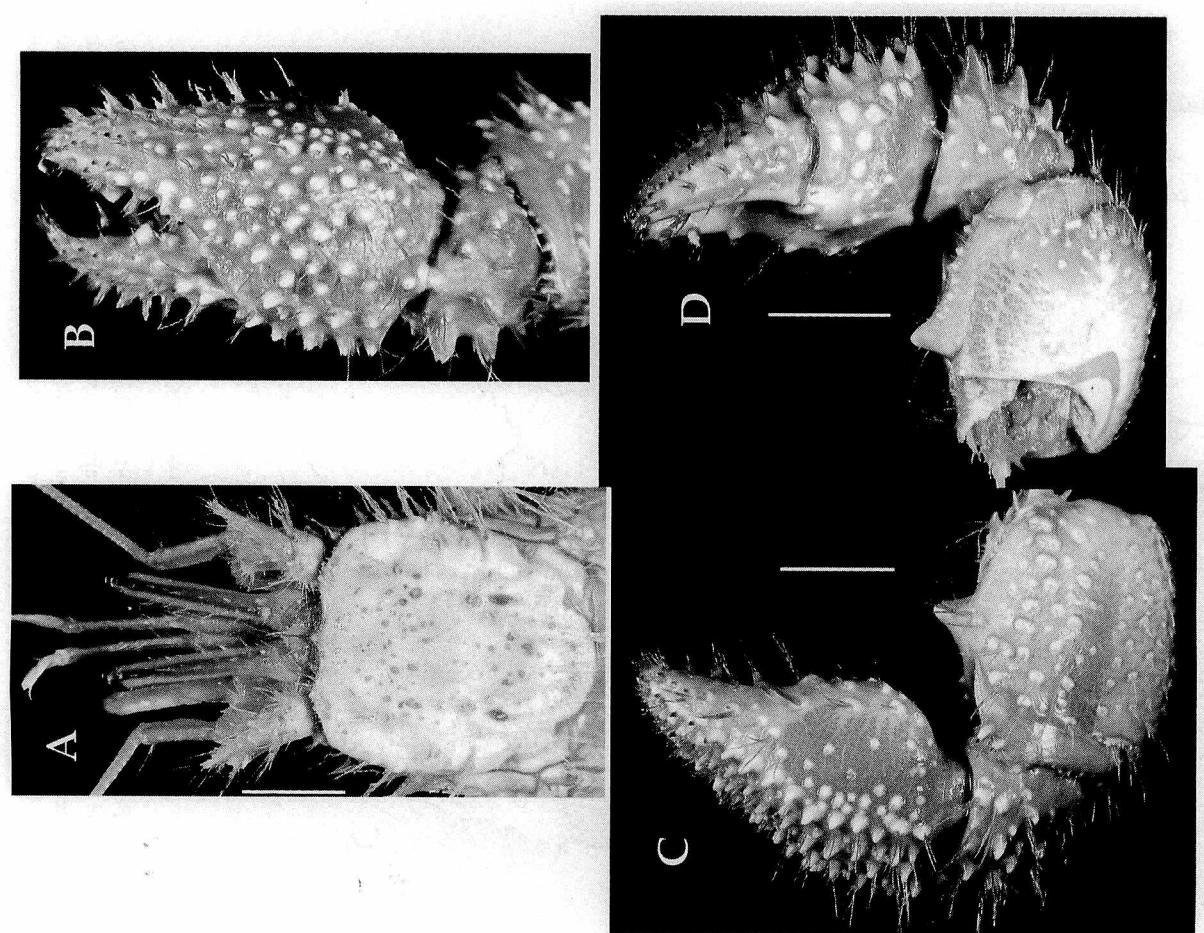


Fig. 5. *Clibanarius infraspinatus* Hilgendorf, 1869: ♂, SL = 12.00 mm, Takaoka-shi, Toyama-ken, TOYA Z81-52-r. A, Shield and cephalic appendages; B, right cheliped, outer; C, same, lower; D, same, upper. Scales equal 5 mm.

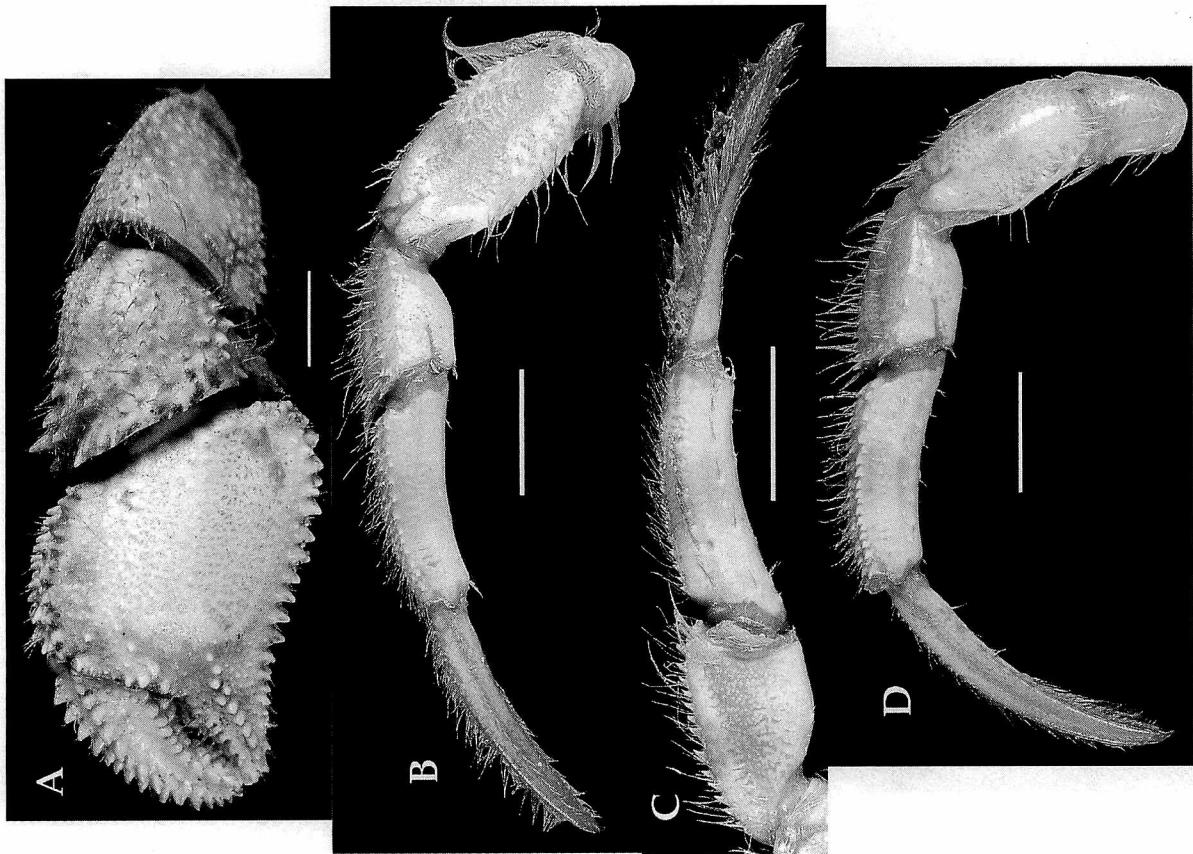


Fig. 8. *Diogenes edwardsii* (De Haan, 1849): ♂, SL = 9.35 mm, Toyama-shi, Toyama-ken, TOYA Z90-28-a. A, left cheliped, outer; B, left second pereopod, lateral; C, same, dactyl, propodus and carpus, mesial; D, left third pereopod, lateral. Scales equal 5 mm.

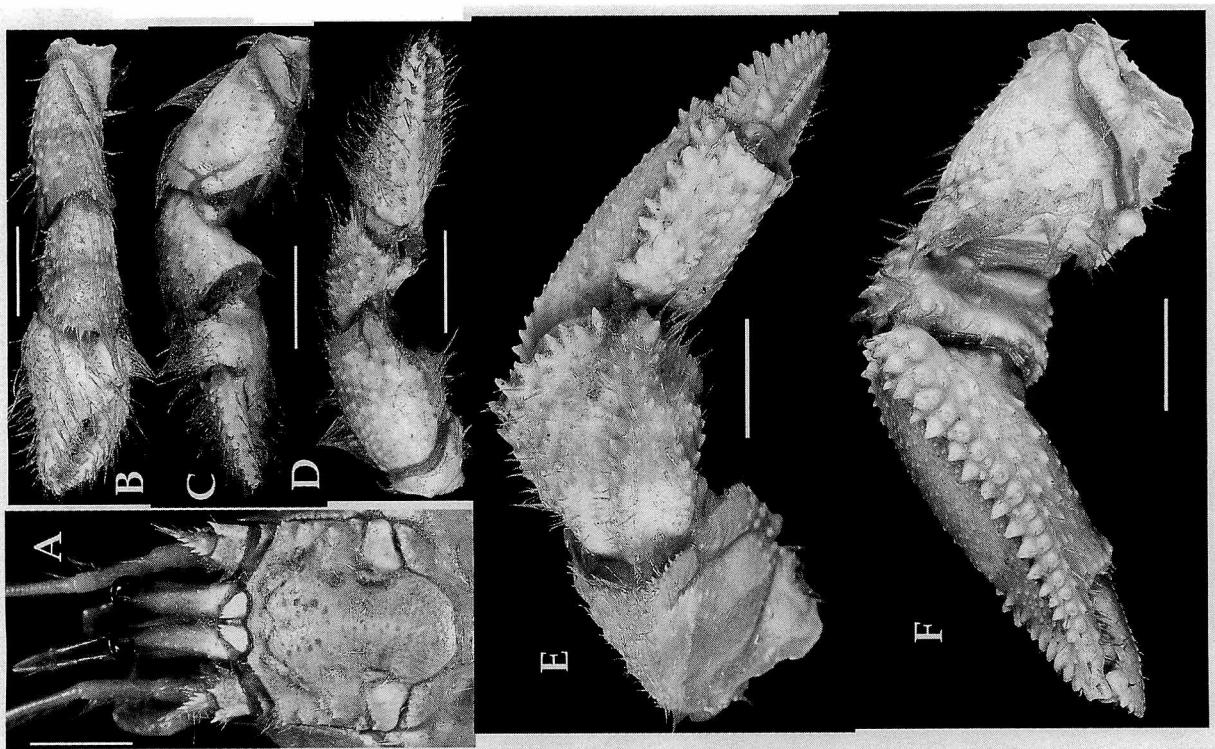


Fig. 7. *Diogenes edwardsii* (De Haan, 1849): ♂, SL = 9.35 mm, Toyama-shi, Toyama-ken, TOYA Z90-28-a. A, shield and cephalic appendages, dorsal; B, right cheliped, outer; C, same, upper; D, same, lower; E, left cheliped, upper; F, same, lower. Scales equal 5 mm.

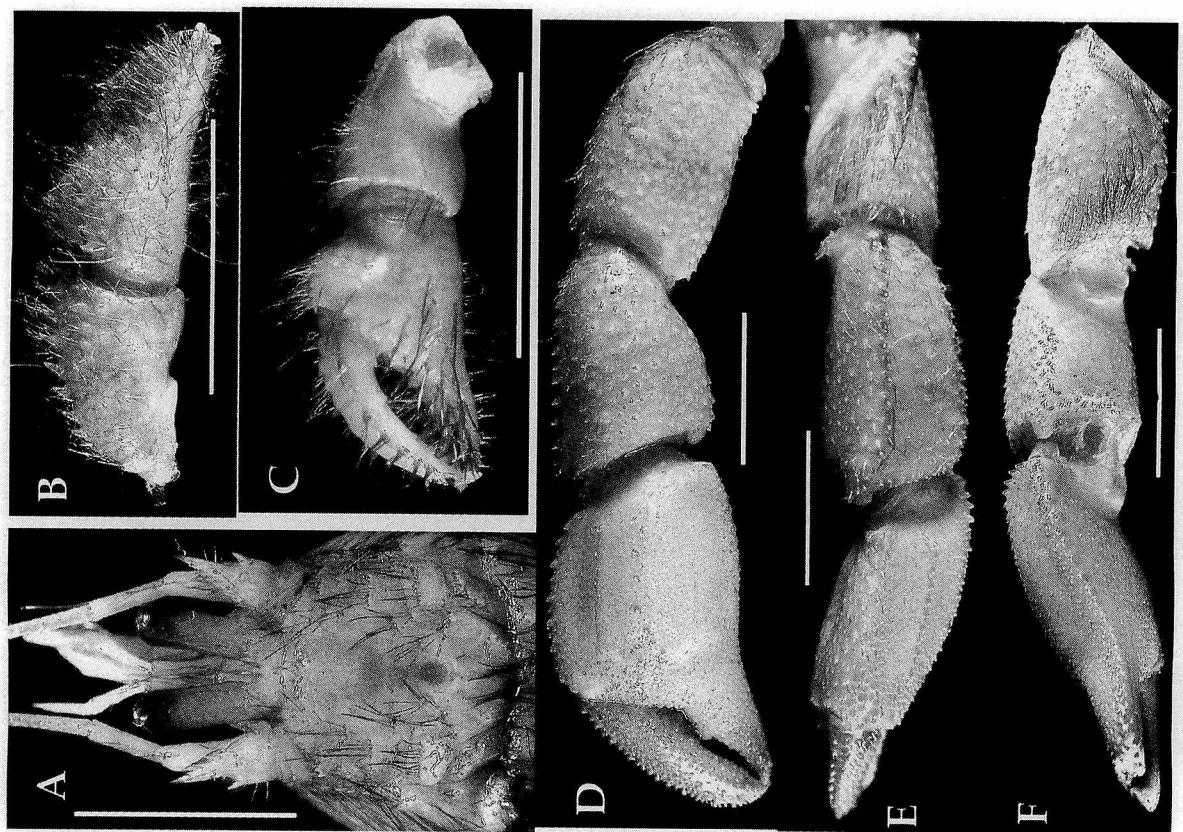


Fig. 9. *Diogenes nitidimanus* Terao, 1913: ♂, SL = 5.30 mm, Peter the Great Bay, Russia, CBM-ZC 8381. A, shield and cephalic appendages, dorsal; B, right cheliped, outer; C, same, inner; D, left cheliped, outer; E, same, upper; F, same, lower. Scales equal 5 mm.



Fig. 10. *Diogenes nitidimanus* Terao, 1913: ♂, SL = 5.30 mm, Peter the Great Bay, Russia, CBM-ZC 8381. A, left second pereopod, lateral; B, same, dactyl, propodus and carpus, medial; C, left third pereopod, lateral. Scales equal 5 mm.

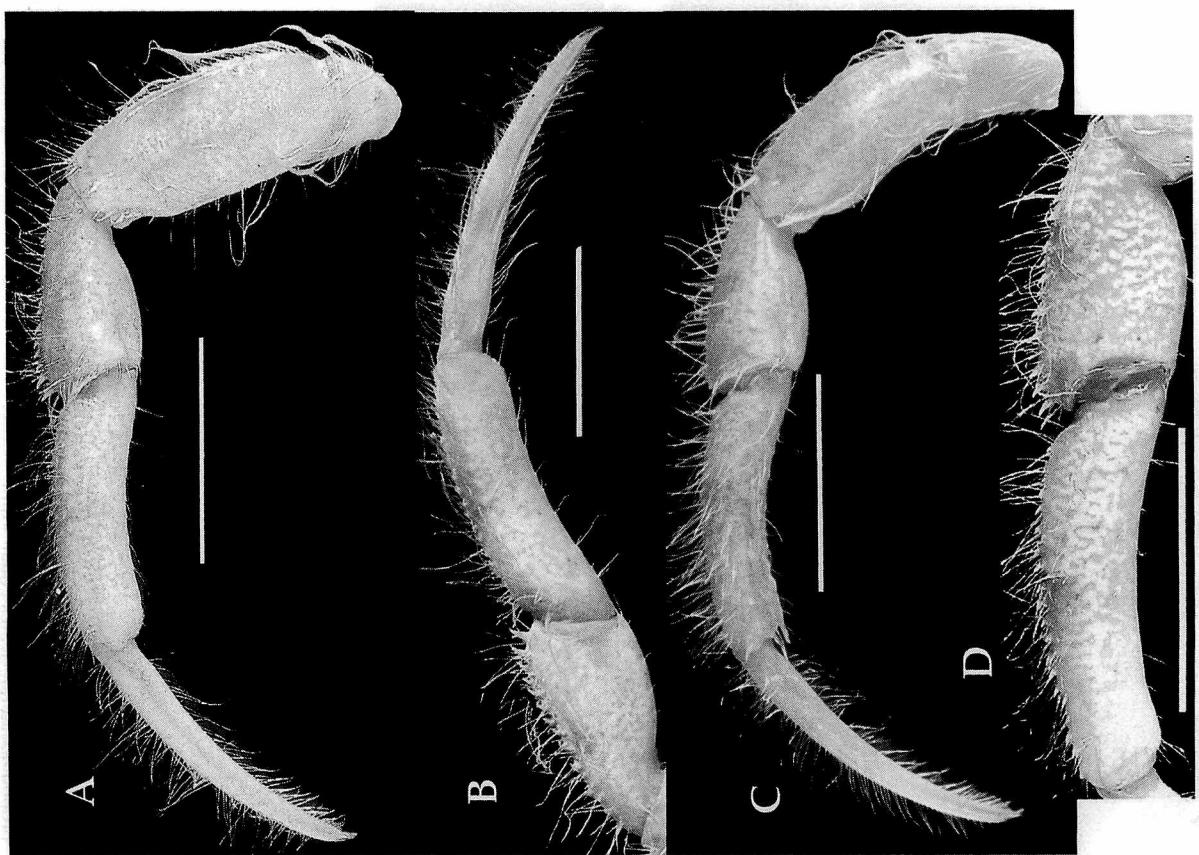


Fig. 12. *Diogenes penicillatus* Stimpson, 1858: ♂, SL = 5.60 mm, Toyama-shi, Toyama-ken, TOYA Z90-19-b. A, left second pereopod, lateral; B, right propodus and carpus, medial; C, left third pereopod, lateral; D, same, propodus and carpus, lateral. Scales equal 5 mm.



Fig. 11. *Diogenes penicillatus* Stimpson, 1858: ♂, SL = 5.60 mm, Toyama-shi, Toyama-ken, TOYA Z90-19-b. A, shield and cephalic appendages, dorsal; B, right cheliped, outer; C, same, upper; D, left cheliped, outer; E, same, upper; F, same, lower. Scales equal 5 mm.

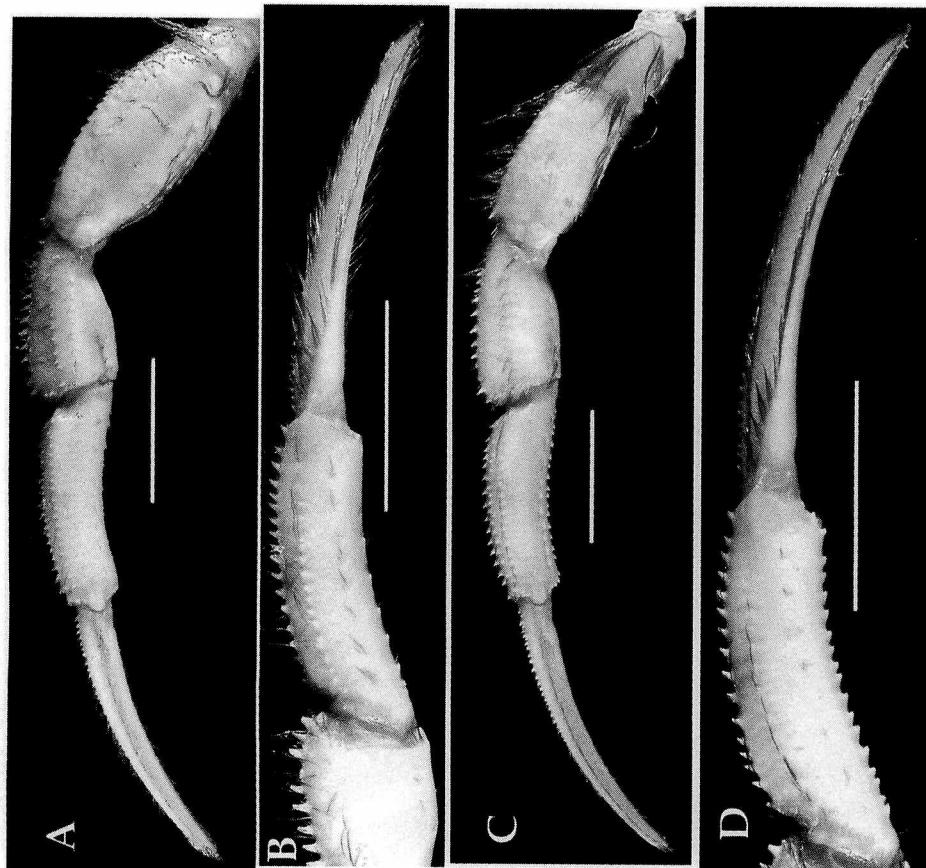


Fig. 14. *Diogenes spinifrons* (De Haan, 1849): ♂, SL = 6.60 mm, Jyoetsu-shi, Niigata-ken, CBM-ZC 8382. A, left second pereopod, lateral; B, same, dactyl, propodus and distal half of carpus, mesial; C, left third pereopod, lateral; D, same, dactyl and propodus, lateral. Scales equal 5 mm.

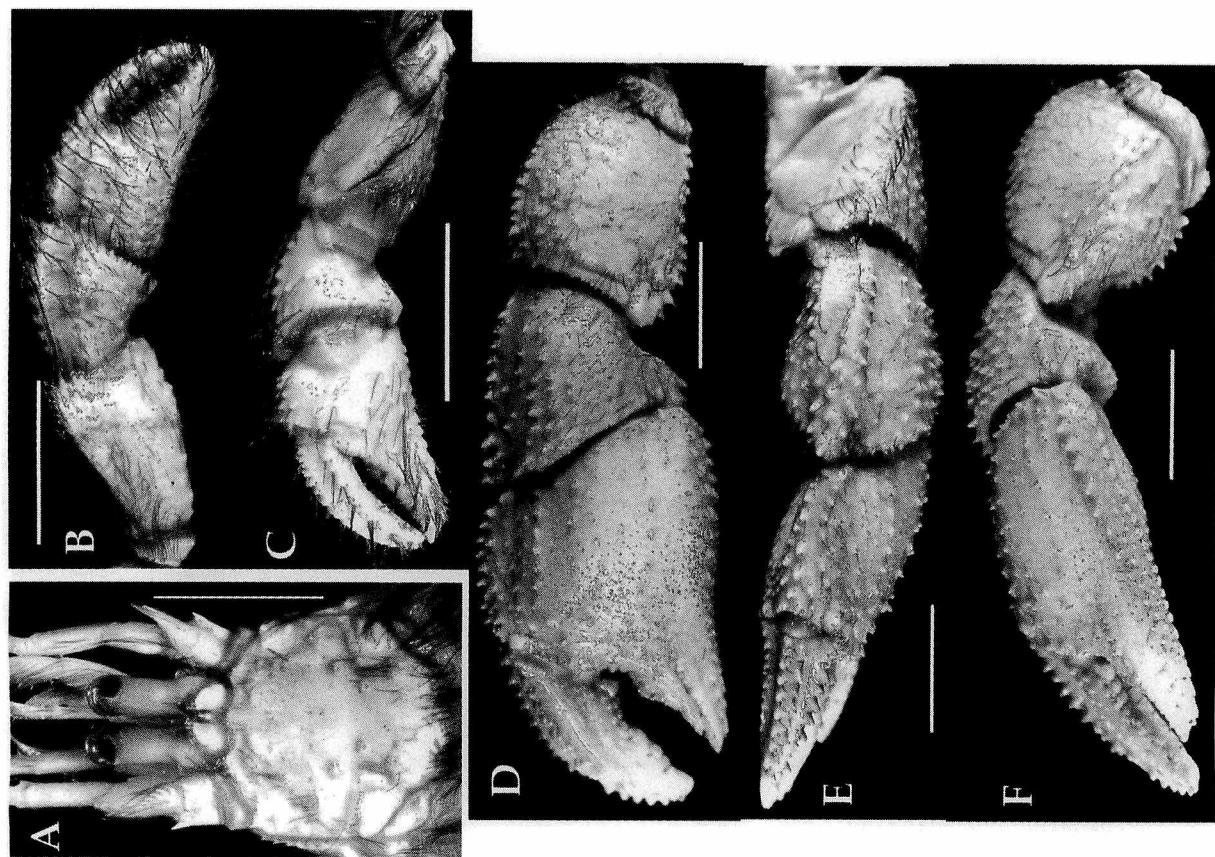


Fig. 13. *Diogenes spinifrons* (De Haan, 1849): ♂, SL = 7.10 mm, Jyoetsu-shi, Niigata-ken, CBM-ZC 8382. A, shield and cephalic appendages, dorsal; B, right cheliped, outer; C, same, inner; D, left cheliped, outer; E, same, upper; F, same, lower. Scales equal 5 mm.

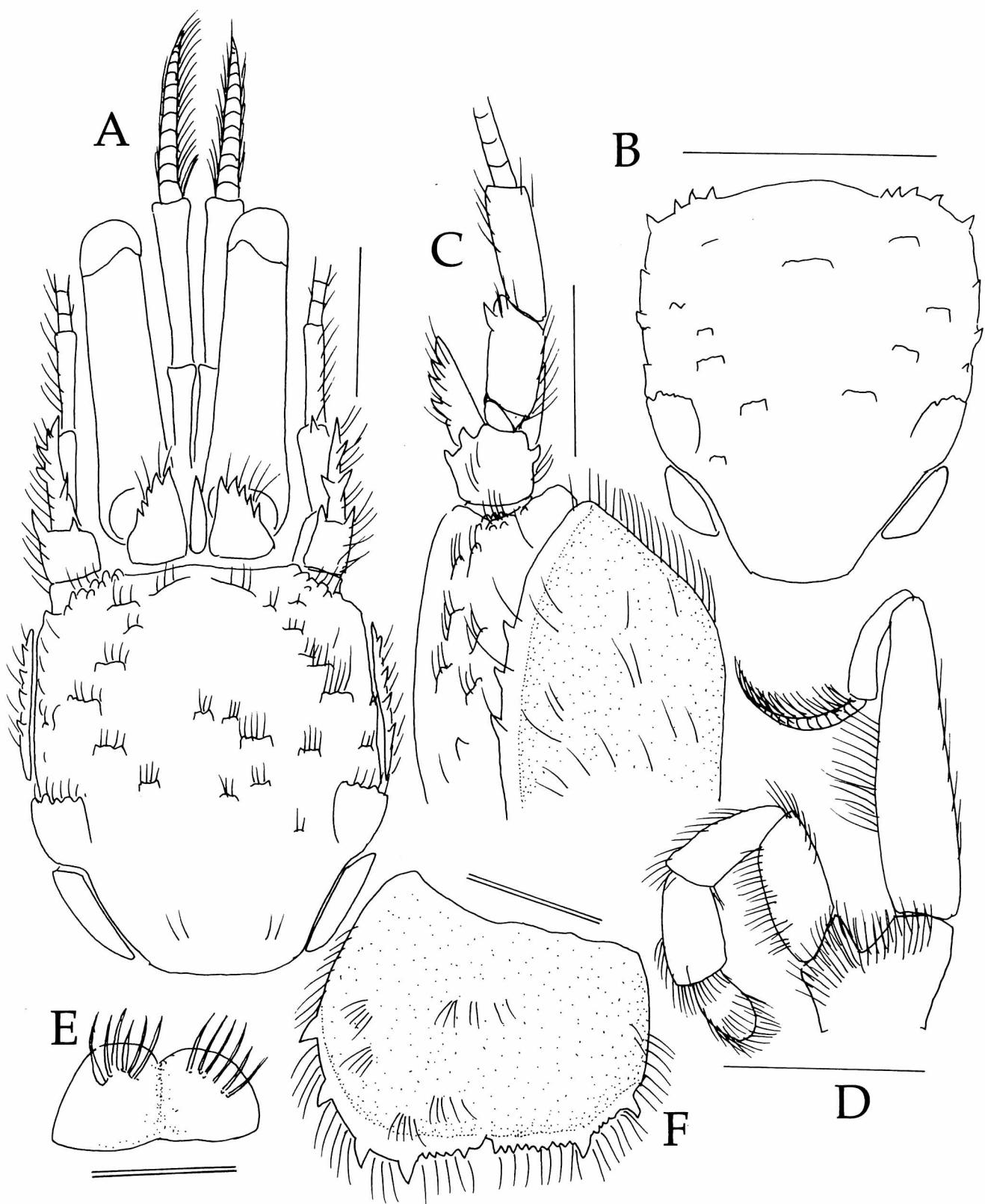


Fig. 15. *Diogenes izanamiae* new species: holotype, ♂, SL = 2.45 mm, Tsukumo Bay, Noto Peninsula, Ishikawa-ken, OMNH Ar 2137. A, shield and cephalic appendages, dorsal; B, shield and its lateral elements, dorsal; C, antennal peduncle and anterior portions of shield and branchiostegite, right lateral; D, right third maxilliped, inner; E, anterior lobe of sternite of third pereopods, ventral; F, telson, dorsal. Setae omitted in B. Scales equal 1 mm for A - D and 0.5 mm for E and F.

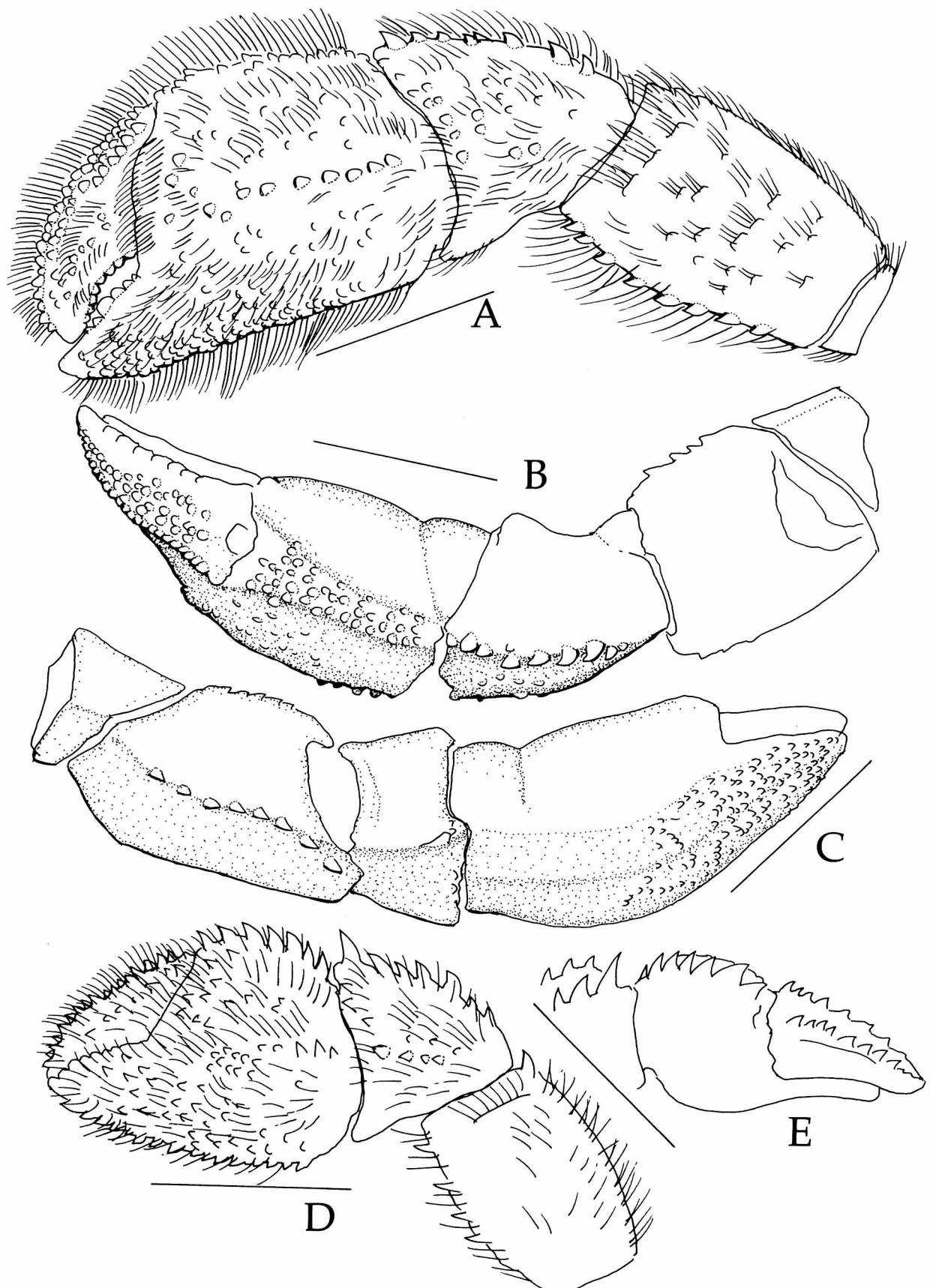


Fig. 16. *Diogenes izanamiae* new species: A-C, holotype ♂, SL = 2.45 mm, Tsukumo Bay, Noto Peninsula, Ishikawa-ken, OMNH Ar 2137; D-E, paratype (allotype), ov. ♀, SL = 2.25 mm, Ossaka, Noto Peninsula, Ishikawa-ken, NMCI-AR-154. A, D, left cheliped, outer; B, same, upper; C, same, lower; E, chela and distal portion of carpus, upper. Setae omitted in B, C and E. Scales equal 1 mm.

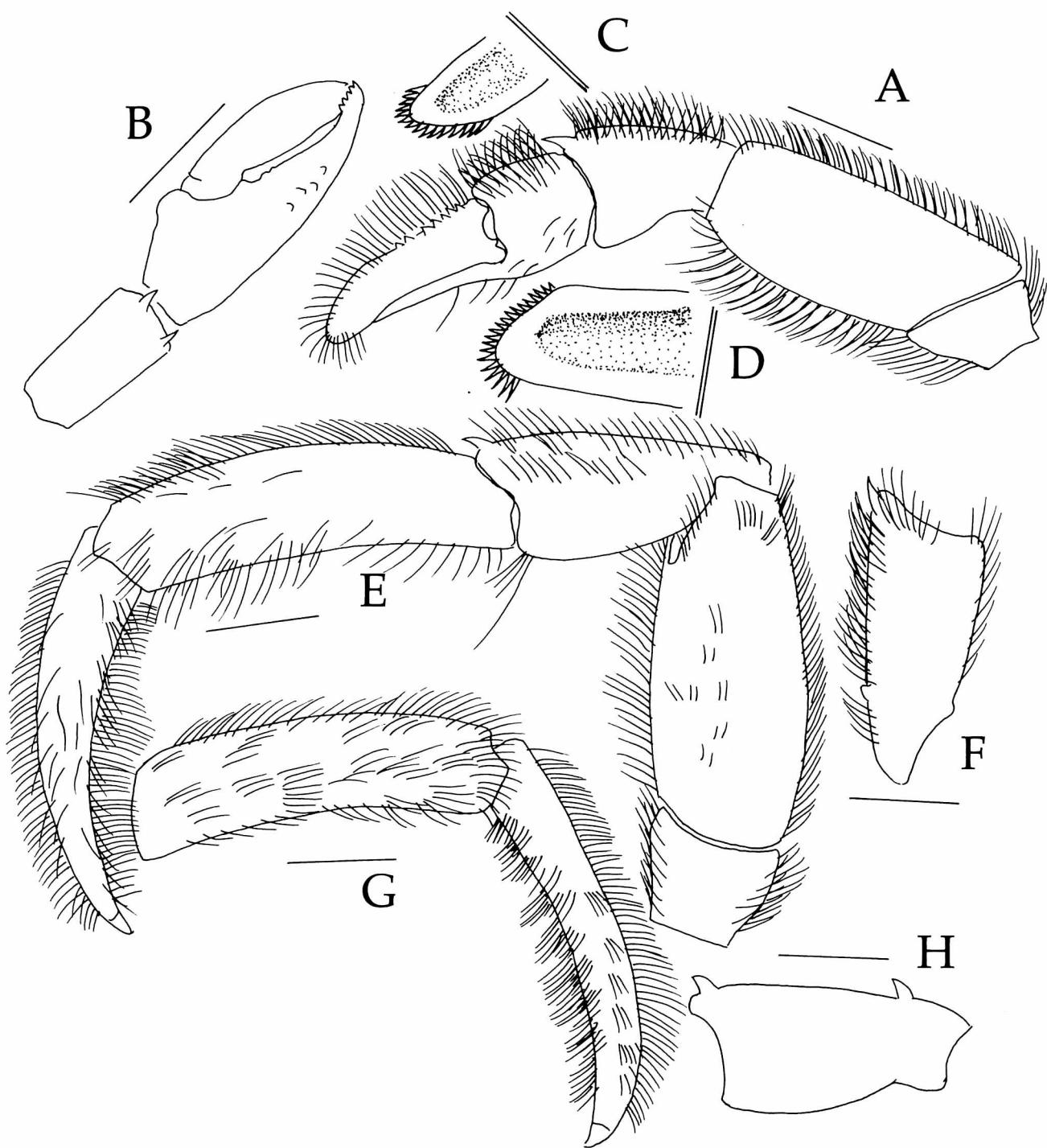


Fig. 17. *Diogenes izanamiae* new species: holotype, ♂, SL = 2.45 mm, Tsukumo Bay, Noto Peninsula, Ishikawa-ken, OMNH Ar 2137. A, right cheliped, upper; B, same, chela and carpus, outer; C, same, distal portion of lower face of dactyl; D, same, distal portion of upper face of fixed finger; E, left second pereopod, lateral; F, same, carpus, mesial; G, same, dactyl and propodus, mesial; H, carpus of right second pereopod, mesial. Setae omitted in B, C, D, and H. Scales equal 1 mm for A, B, E - H and 0.5 mm for C, D.

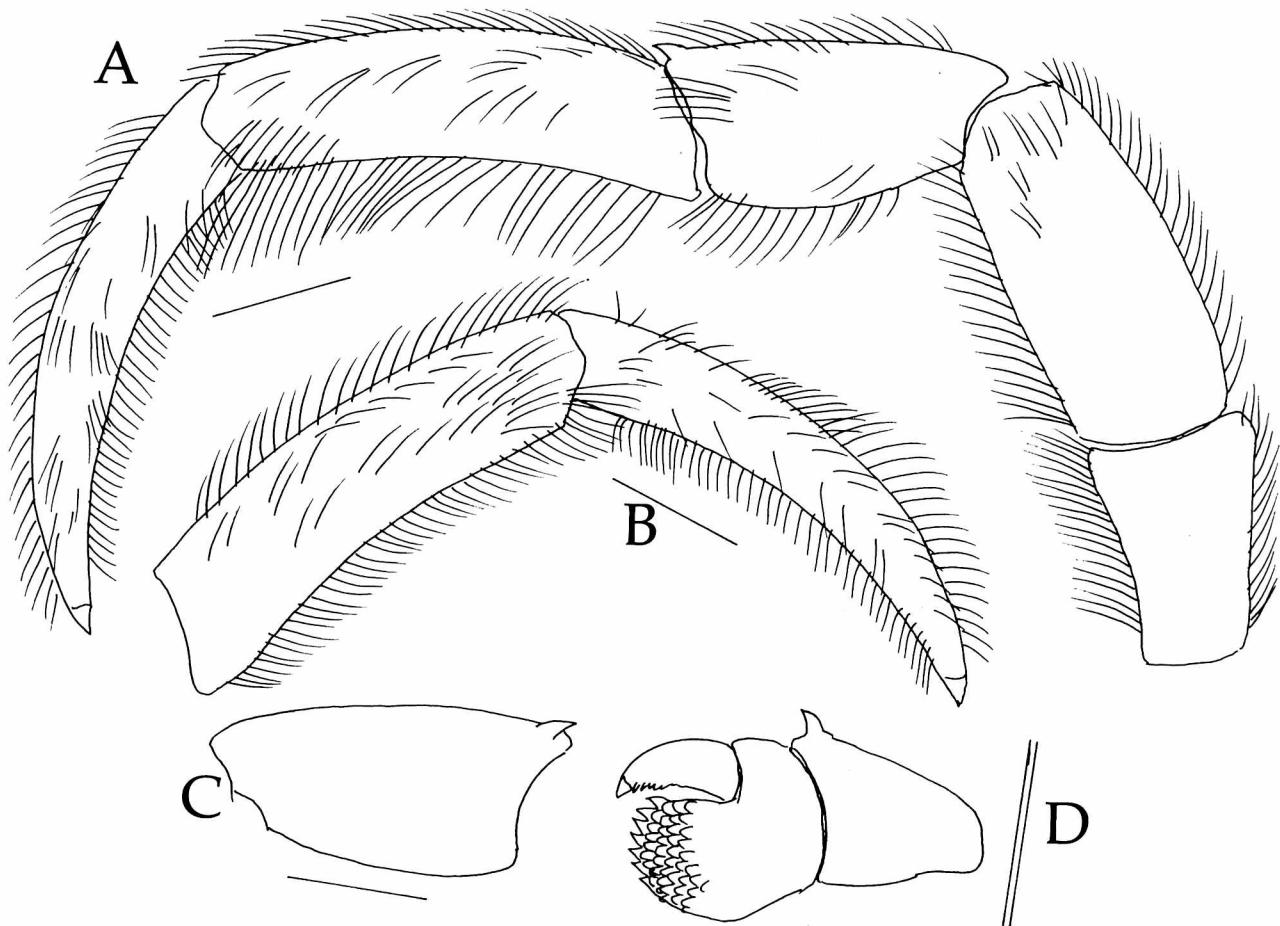


Fig. 18. *Diogenes izanamiae* new species: holotype, ♂, SL = 2.45 mm, Tsukumo Bay, Noto Peninsula, Ishikawa-ken, OMNH Ar 2137. A, left third pereopod, lateral; B, same, dactyl and propodus, mesial; C, same, carpus, mesial; D, chela and carpus of left fourth pereopod, lateral. Setae omitted in C and D. Scales equal 1 mm for A - C and 0.5 mm for D.



Fig. 20. *Paguristes digitalis* Stimpson, 1858: ♂, SL = 13.15 mm, Fukiura, Yamagata-ken, YPM-SS 1749. A, right second pereopod, lateral; B, same, dactyl, propodus and carpus, mesial; C, right third pereopod, lateral. Setae partially cut off. Scales equal 5 mm.

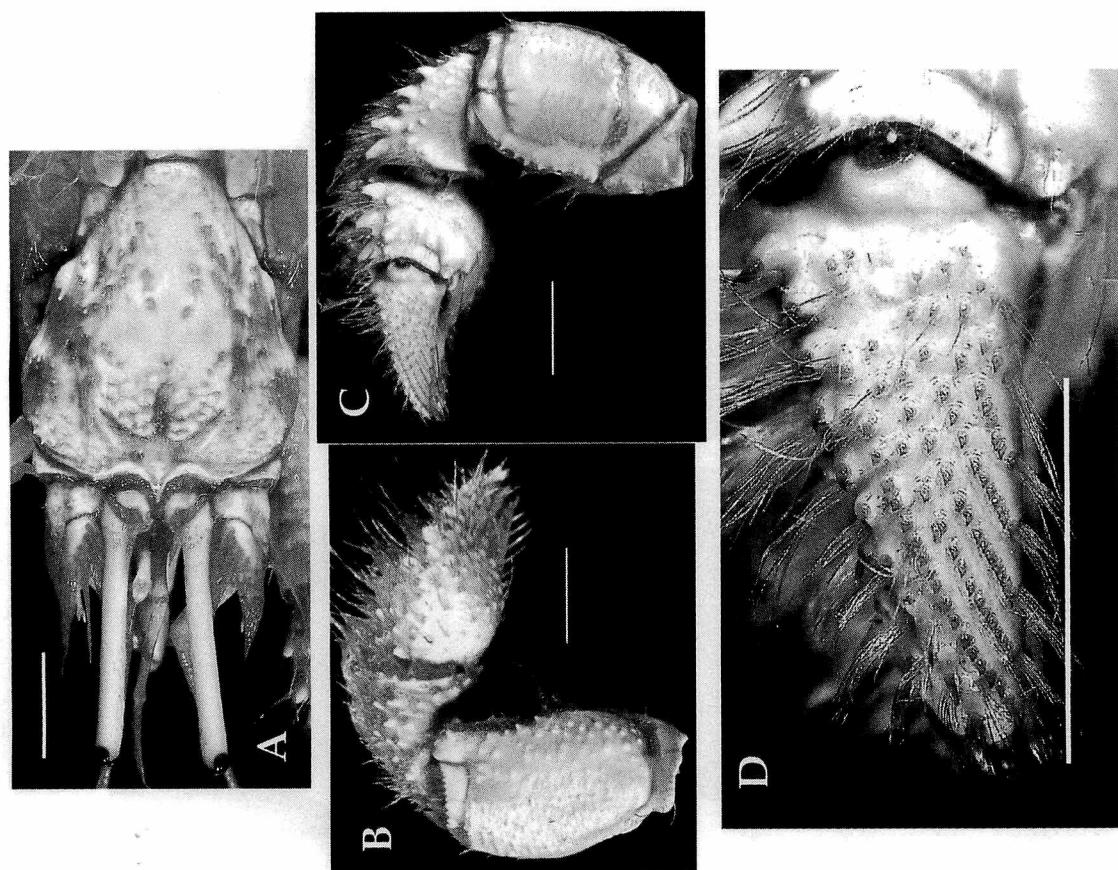


Fig. 19. *Paguristes digitalis* Stimpson, 1858: ♂, SL = 13.15 mm, Fukiura, Yamagata-ken, YPM-SS 1749. A, shield and cephalic appendages, dorsal; B, right cheliped, upper; C, same, lower; D, same, dactyl, upper. Scales equal 5 mm.

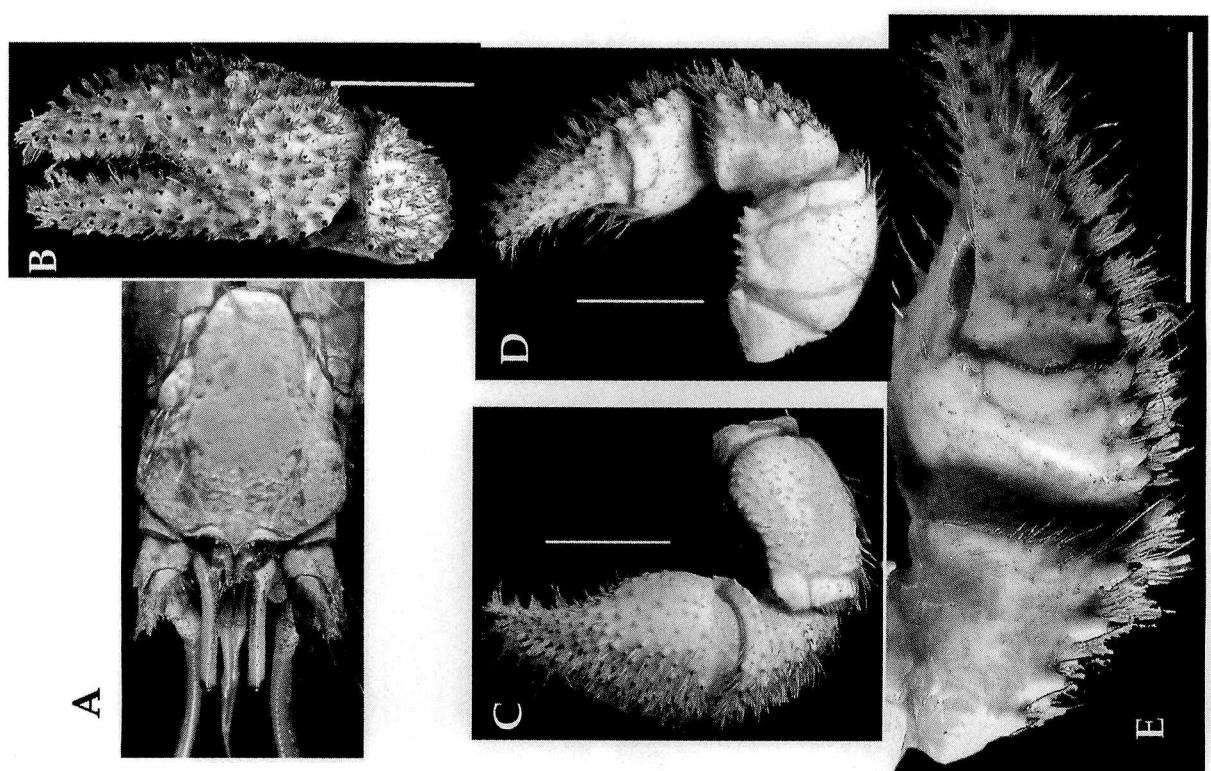


Fig. 21. *Paguristes japonicus* Miyake, 1961: ♂, SL = 9.20 mm, Oga Peninsula, Akita-ken, OMNH Ar 2133. A, shield and cephalic appendages, dorsal; B, right cheliped, chela and carpus, outer; C, same, lower; D, same, upper; E, same, chela and carpus, upper. Scales equal 5 mm.

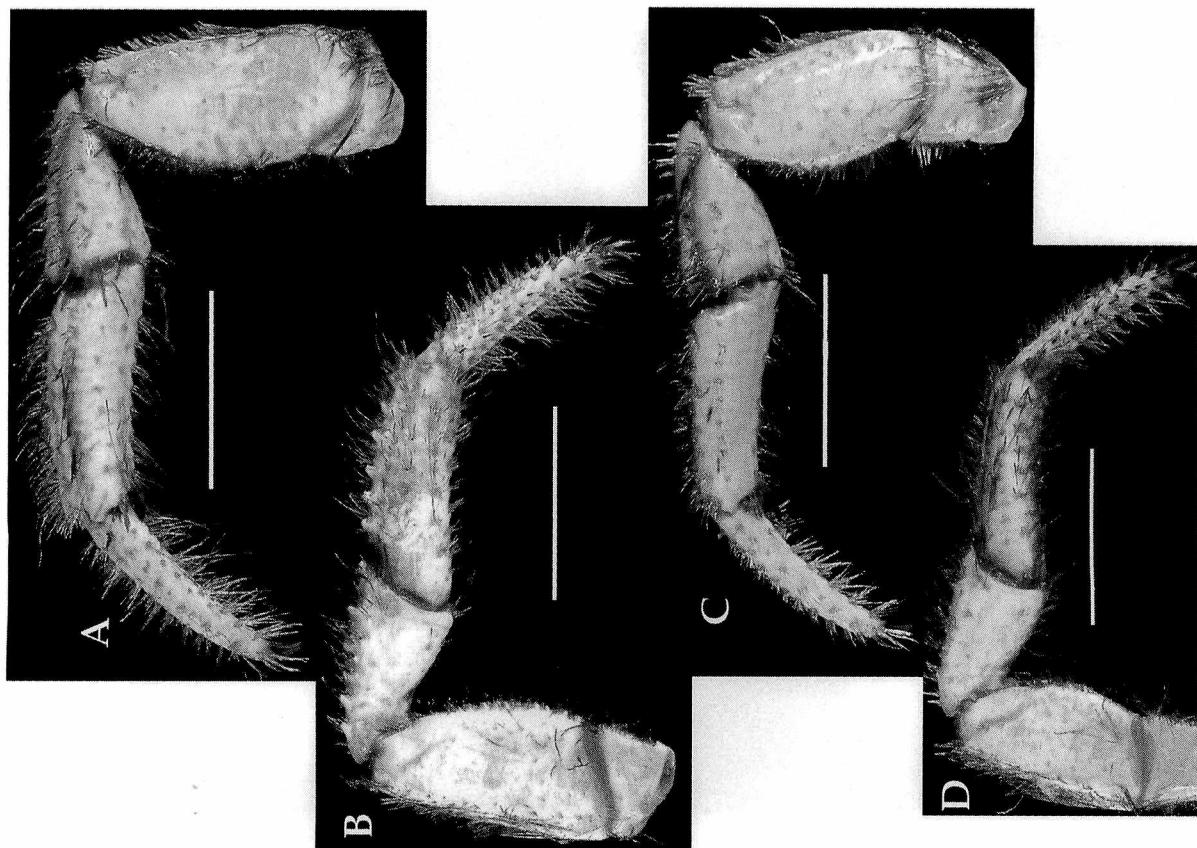


Fig. 22. *Paguristes japonicus* Miyake, 1961: ♂, SL = 9.20 mm, Oga Peninsula, Akita-ken, OMNH Ar 2133. A, left second pereopod, lateral; B, same, mesial; C, left third pereopod, lateral; D, same, mesial. Setae partially cut off. Scales equal 5 mm.

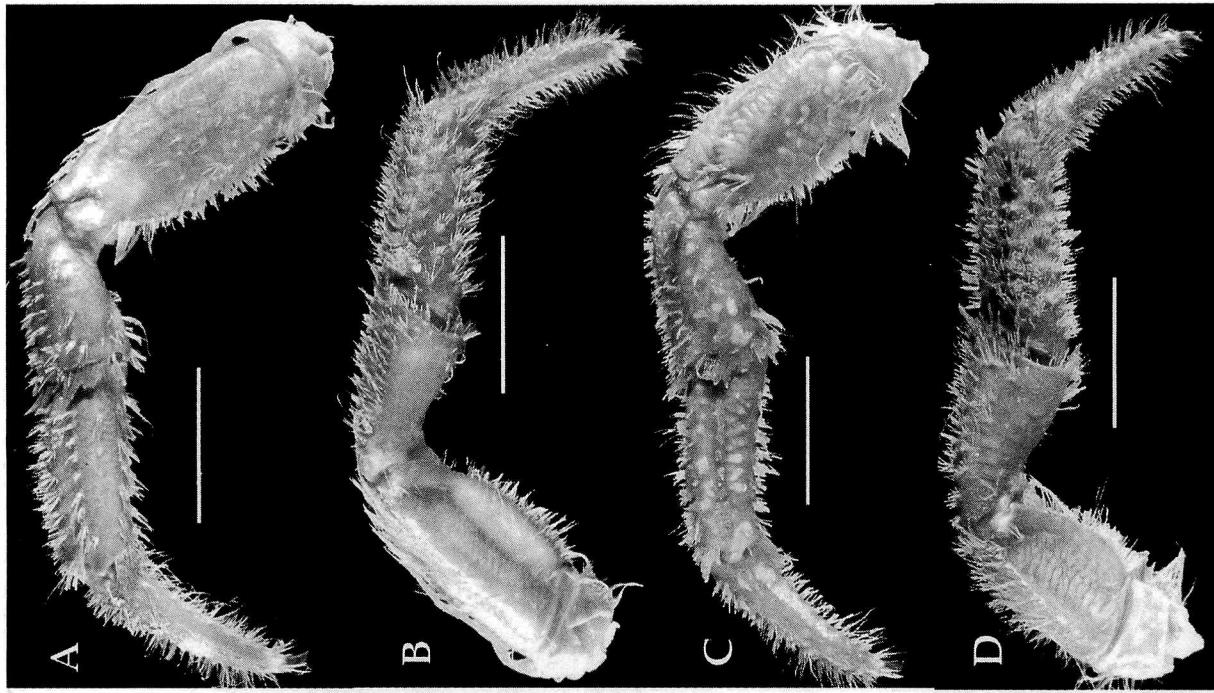


Fig. 24. *Paguristes ortmanni* Miyake, 1978: ♂, SL = 12.30 mm, Tango Peninsula, Kyoto-fu, CBM-ZC 8449. A, left second pereopod, lateral; B, same, medial; C, left third pereopod, lateral; D, same, medial. Setae partially cut off. Scales equal 5mm.

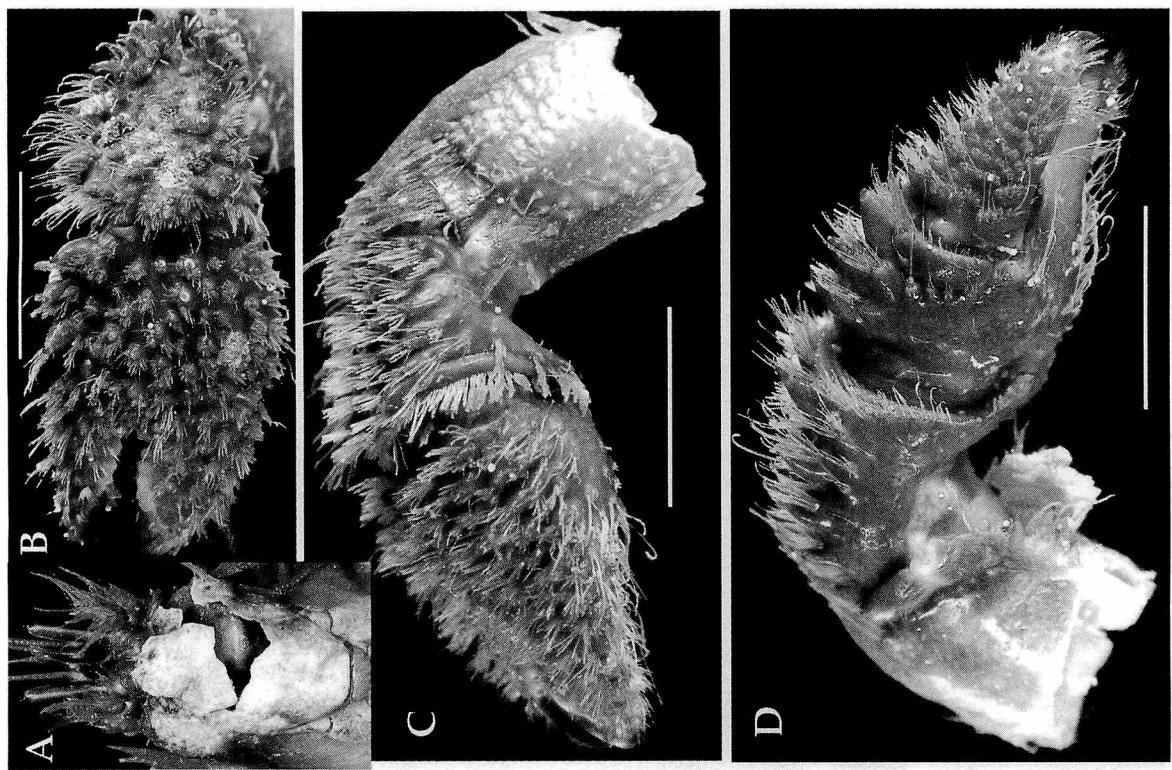


Fig. 23. *Paguristes ortmanni* Miyake, 1978: ♂, SL = 12.30 mm, Tango Peninsula, Kyoto-fu, CBM-ZC 8449. A, shield and cephalic appendages, dorsal (partially broken); B, left cheliped, outer; C, same, lower; D, same, upper. Setae partially cut off in B-D. Scales equal 5 mm.

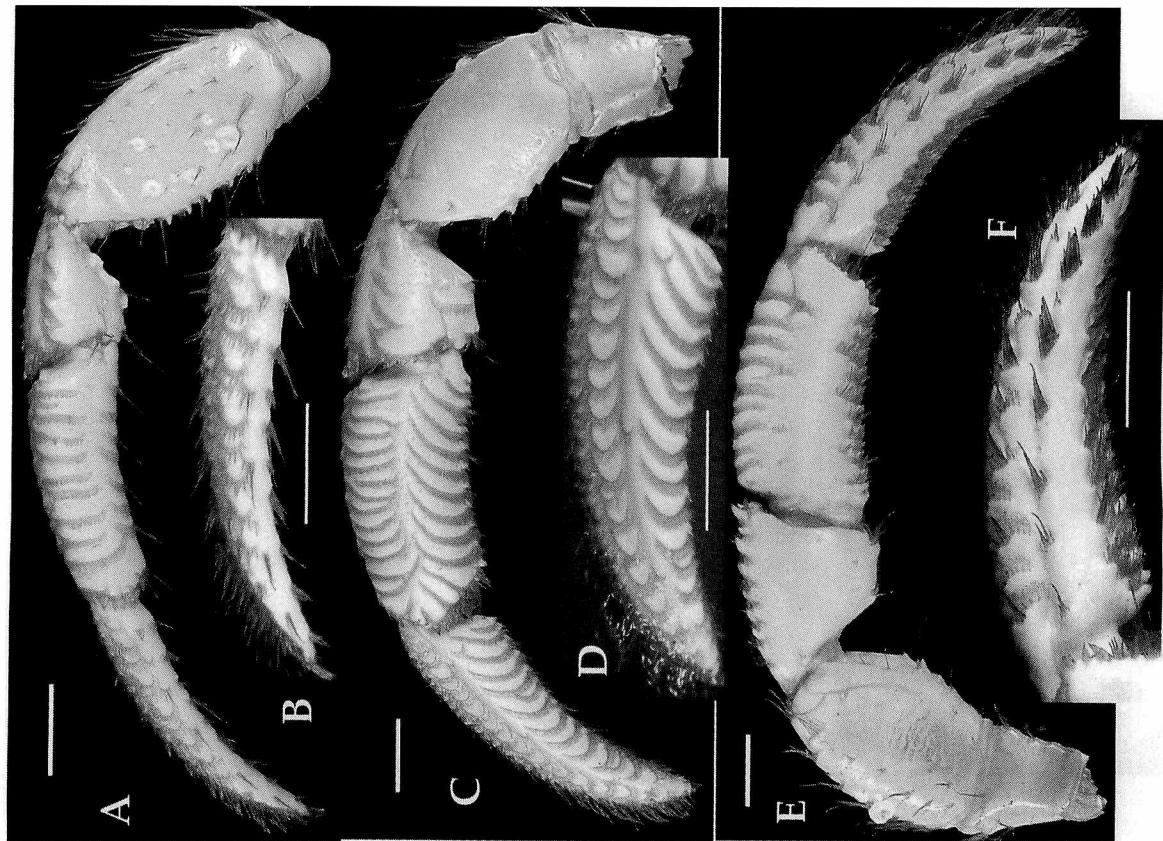


Fig. 26. *Dardanus arrosor* (Herbst, 1796): ov. ♀, SL = 14.55 mm, Sado Island, Niigata-ken, SMBL-NU 22487. A, left second pereopod, lateral; B, same, dactyl, lateral; C, left third pereopod, lateral; D, same, dactyl, lateral; E, left third pereopod, mesial; F, same, dactyl, mesial. Scales equal 5 mm.

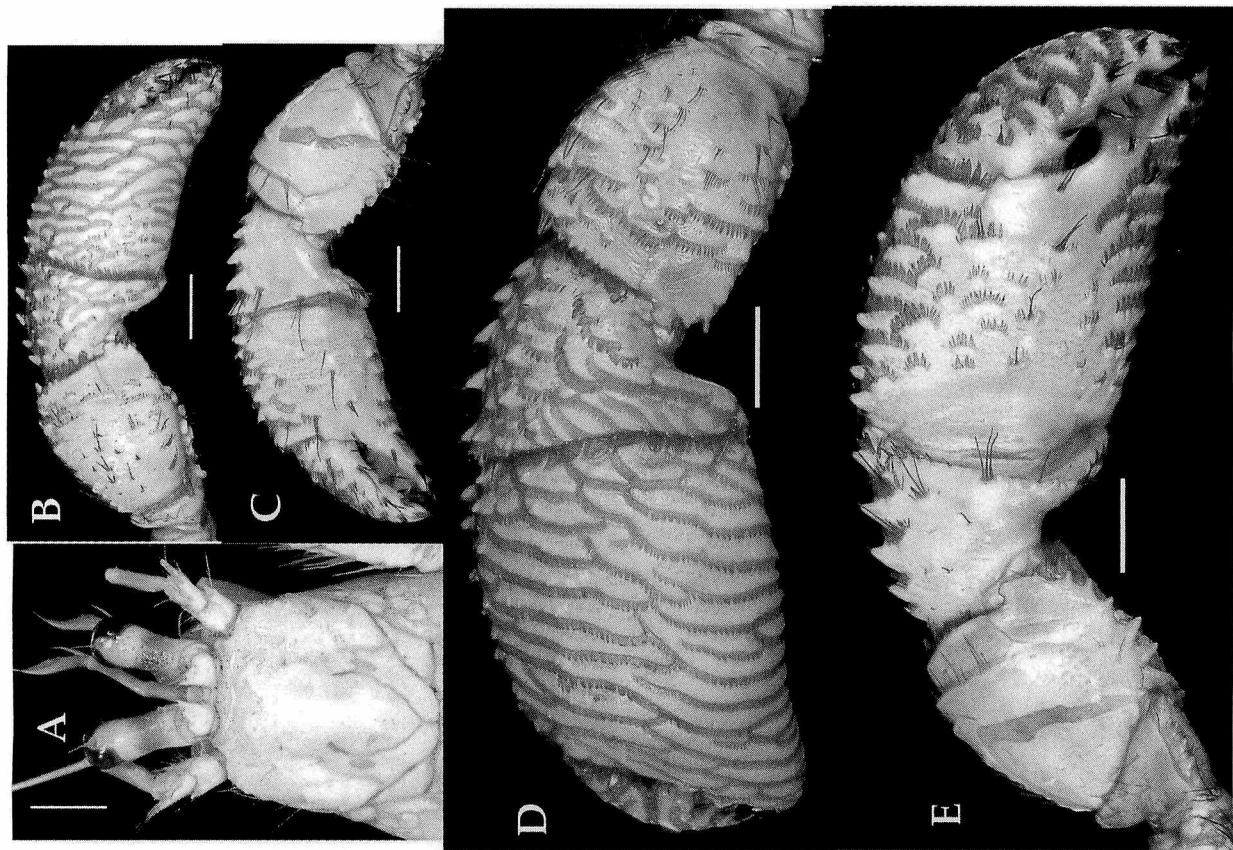


Fig. 25. *Dardanus arrosor* (Herbst, 1796): ov. ♀, SL = 14.55 mm, Sado Island, Niigata-ken, SMBL-NU 22487. A, shield and cephalic appendages, dorsal; B, right cheliped, outer; C, same, inner; D, left cheliped, outer; E, same, inner. Scales equal 5 mm.

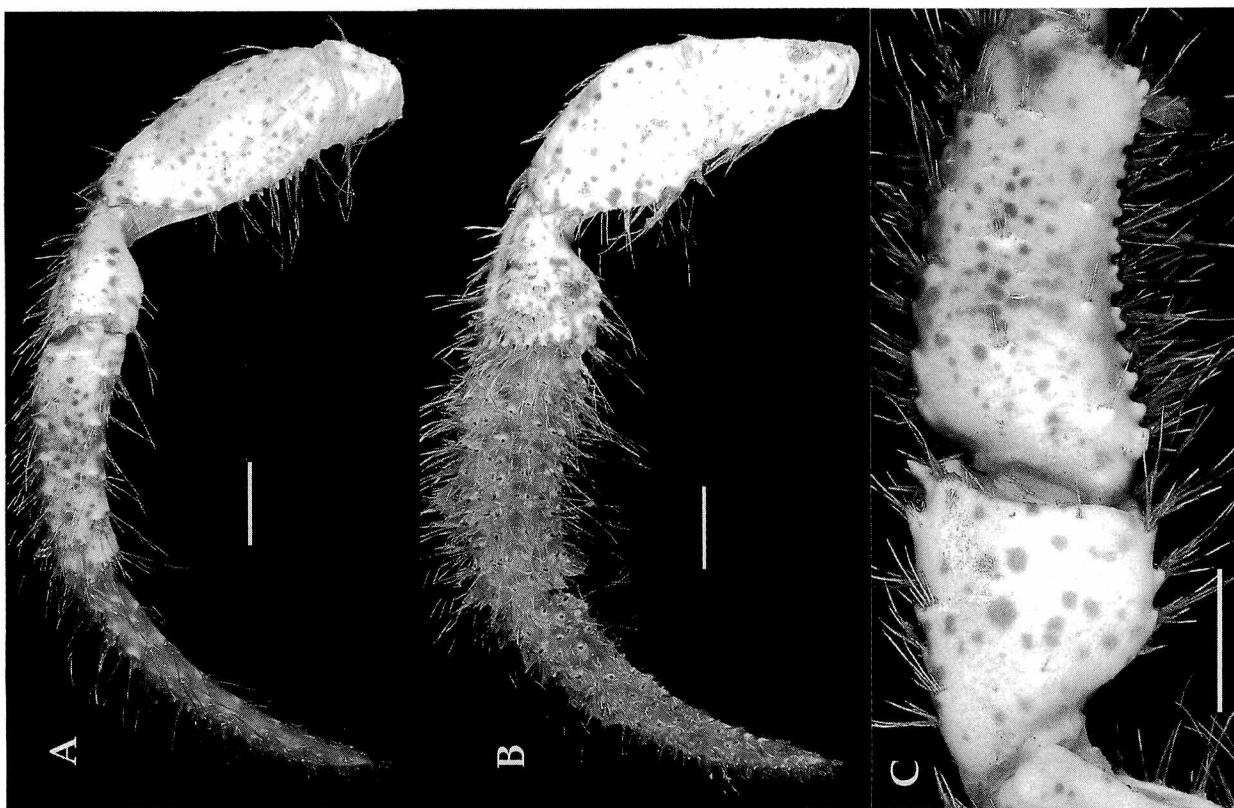


Fig. 28. *Dardanus aspersus* (Berthold, 1845): ♂, SL = 18 mm, Toyama-shi, Toyama-ken, TOYA Z97-13. A, left second pereopod, lateral; B, left third pereopod, lateral; C, same, propodus and carpus, medial. Scales equal 5 mm.

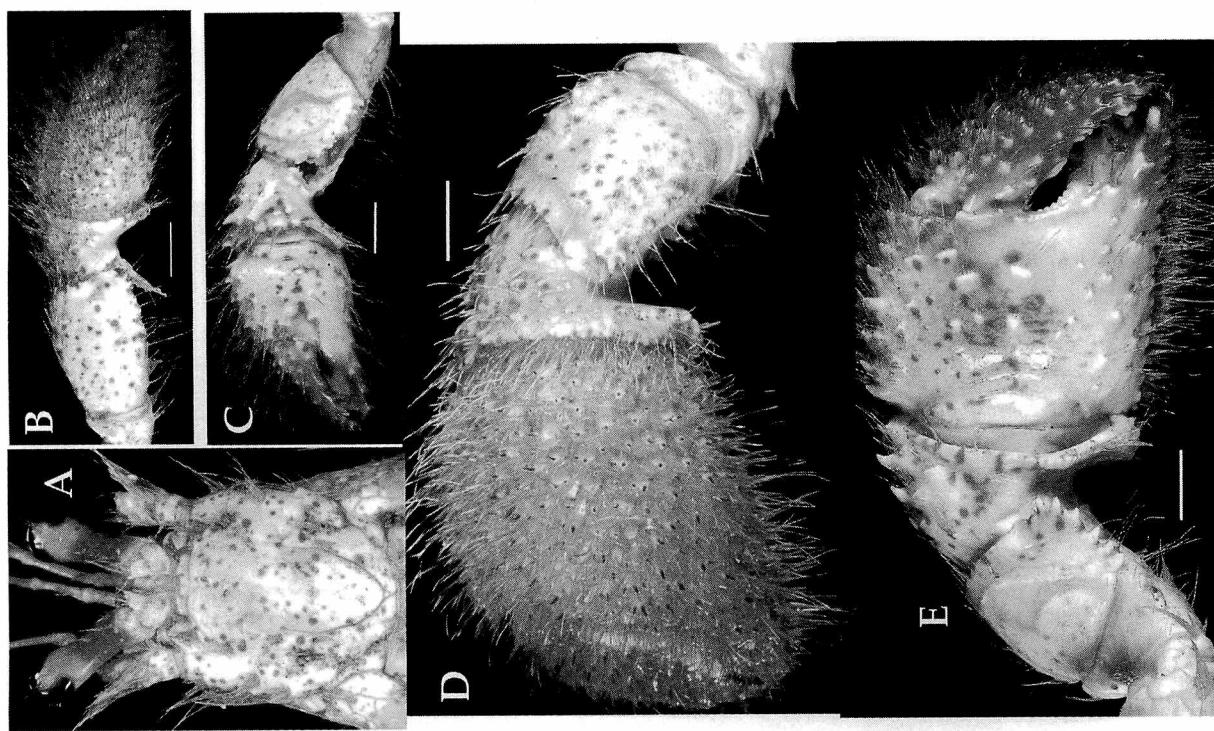


Fig. 27. *Dardanus aspersus* (Berthold, 1845): ♂, SL = 18 mm, Toyama-shi, Toyama-ken, TOYA Z97-13. A, shield and cephalic appendages, dorsal; B, right cheliped, outer; C, same, inner; D, left cheliped, outer; E, same, inner. Scales equal 5 mm.

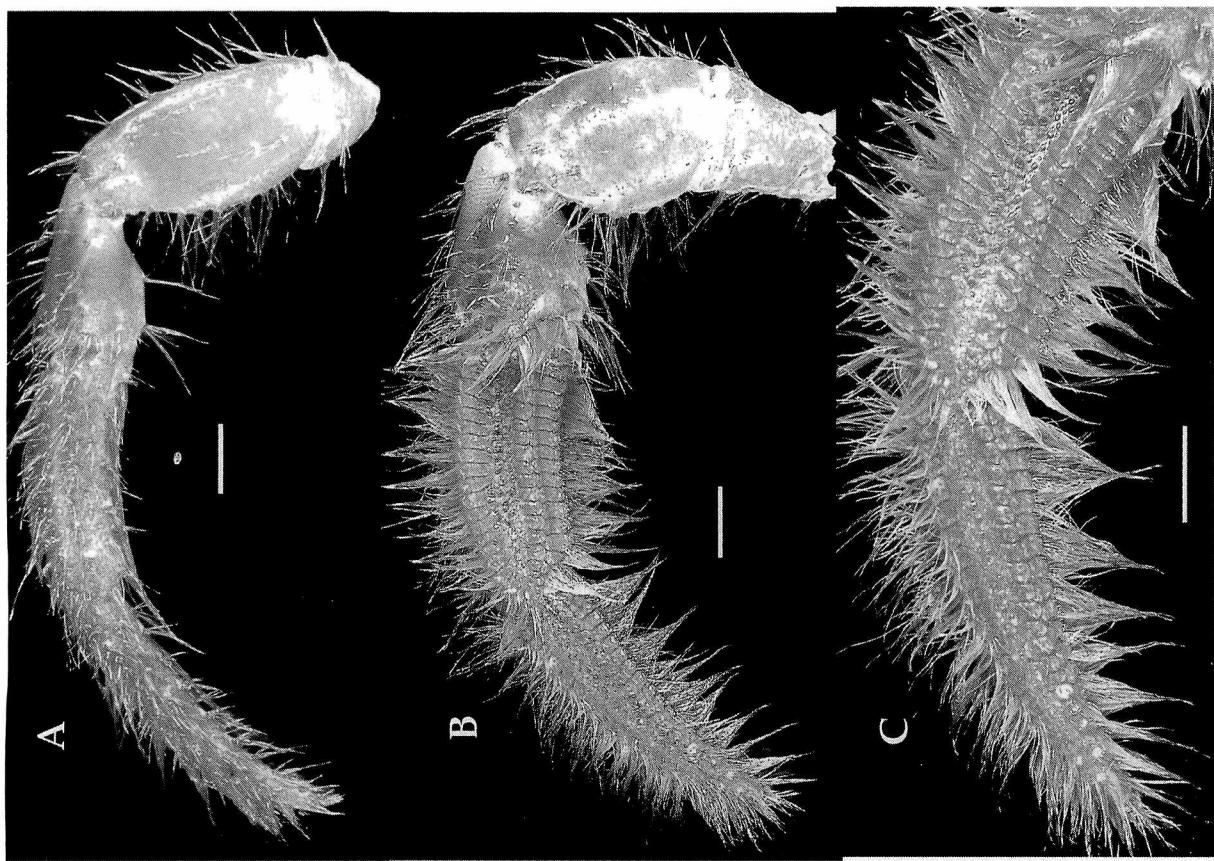


Fig. 30. *Dardanus crassimanus* (H. Milne Edwards, 1836): ♂, SL = 22.75 mm, Kammuri-jima Island, Kyoto-fu, CBM-ZC 8458. A, left second pereopod, lateral; B, left third pereopod, lateral; C, same, slightly cheliped, outer; D, right cheliped, outer; E, same, inner (chela, slightly upper). Scales equal 5 mm.

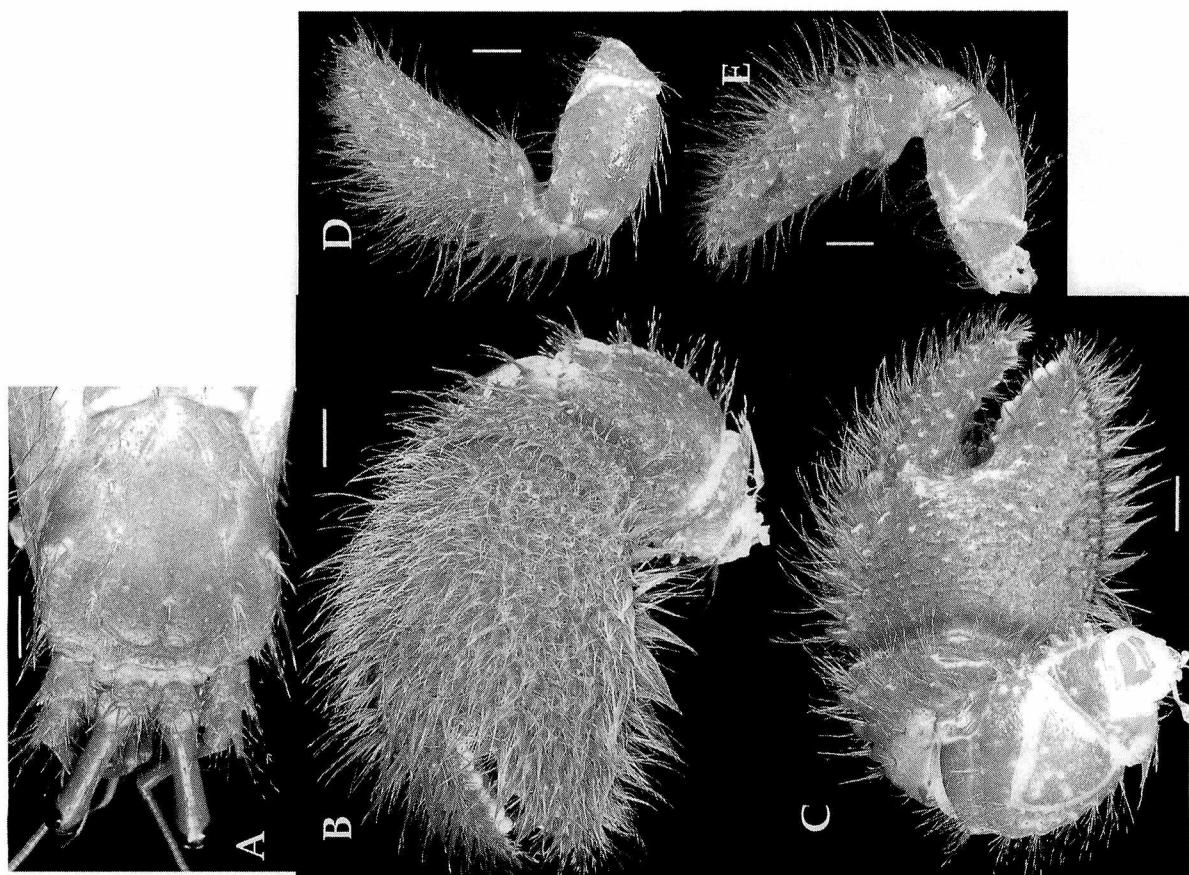


Fig. 29. *Dardanus crassimanus* (H. Milne Edwards, 1836): ♂, SL = 22.75 mm, Kammuri-jima Island, Kyoto-fu, CBM-ZC 8458. A, shield and cephalic appendages, dorsal; B, left cheliped, outer; C, same, inner; D, right cheliped, outer; E, same, inner (chela, slightly upper). Scales equal 5 mm.

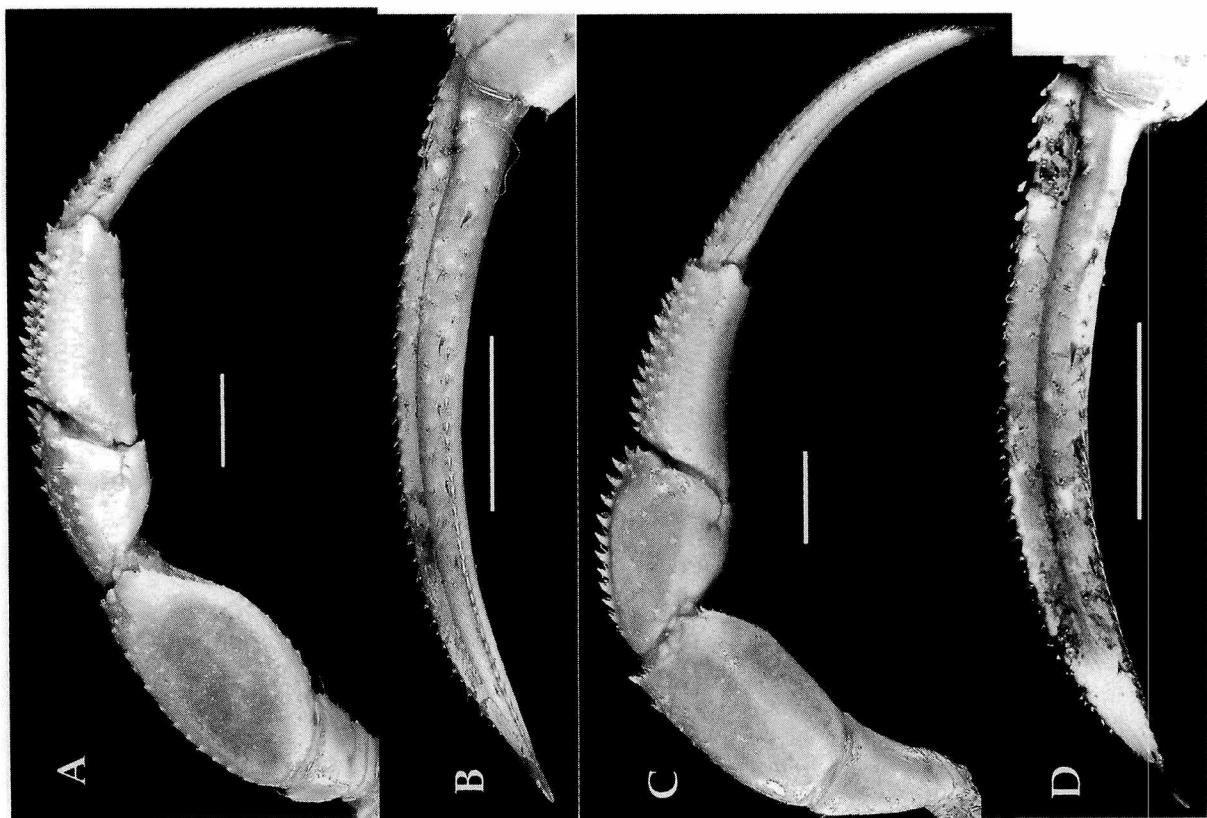


Fig. 32. *Pagurus ochotensis* Brandt, 1851: ♀, SL = 12.80 mm, Mogami-tai, Yamagata-ken, YPM-SS 1724. A, right second pereopod, lateral; B, same, dactyl, mesial; C, right third pereopod, lateral; D, same, dactyl, mesial. Scales equal 5 mm.

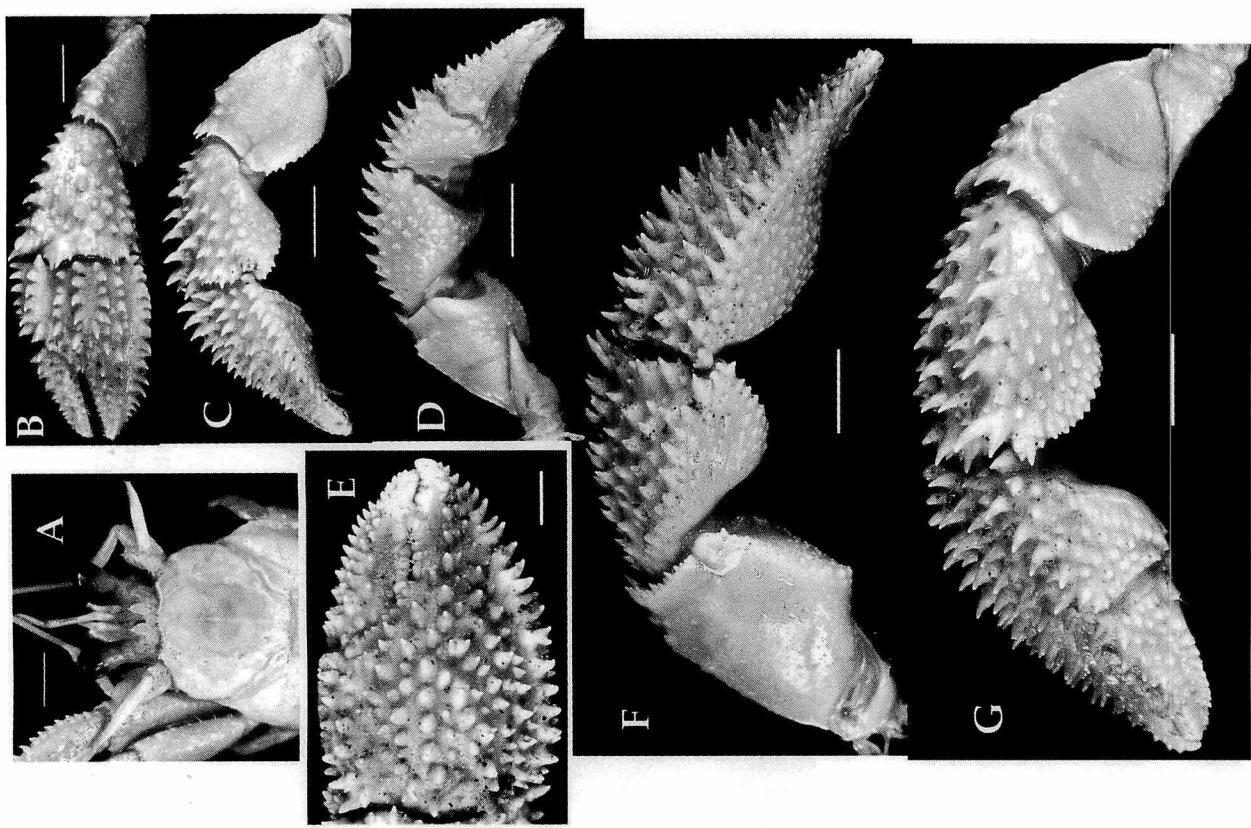


Fig. 31. *Pagurus ochotensis* Brandt, 1851: ♀, SL = 12.80 mm, Mogami-tai, Yamagata-ken, YPM-SS 1724. A, shield and cephalic appendages, dorsal; B, left cheliped, dorsal; C, same, lateral; D, same, mesial; E, right cheliped, chela, dorsal; F, same, lateral; G, same, mesial. Scales equal 5 mm.

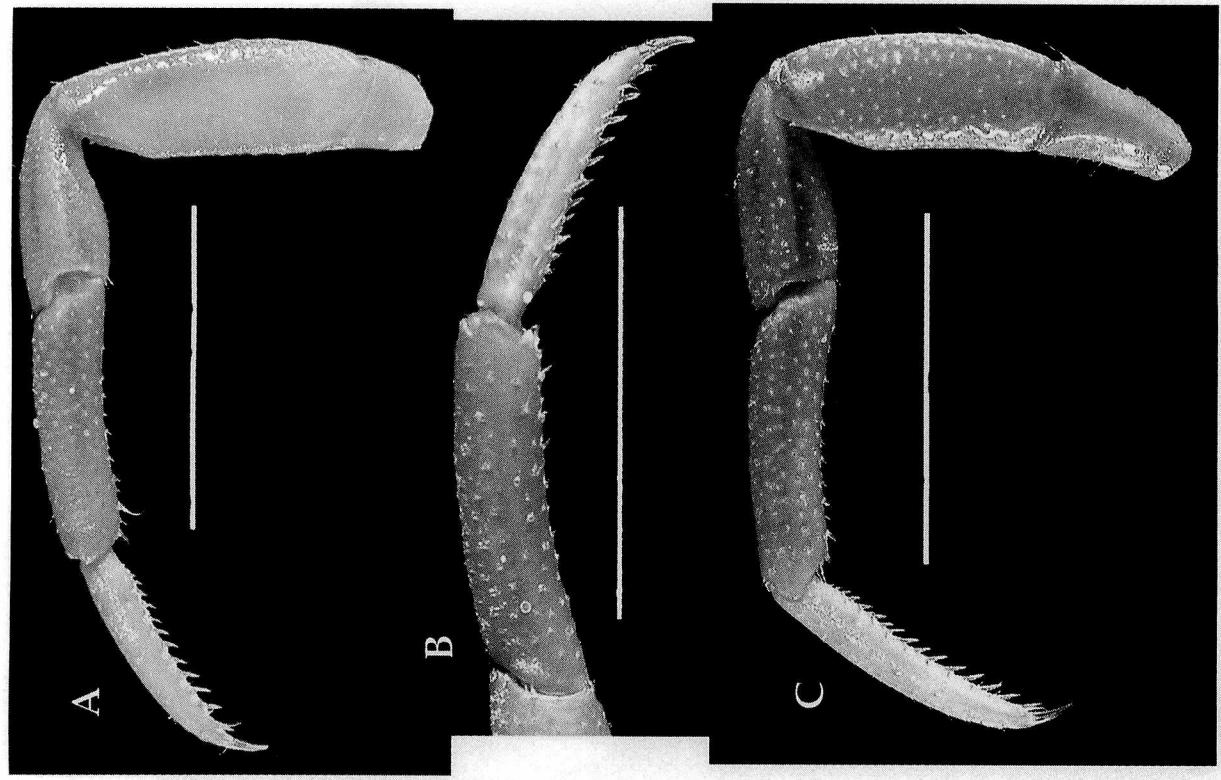


Fig. 34. *Pagurus middendorffii* Brandt, 1851: ♂, SL = 4.20 mm, Shakotan Peninsula, Hokkaido. A, left second pereopod, lateral; B, same, dactyl and propodus, mesial; C, right third pereopod, lateral. Scales equal 5 mm.

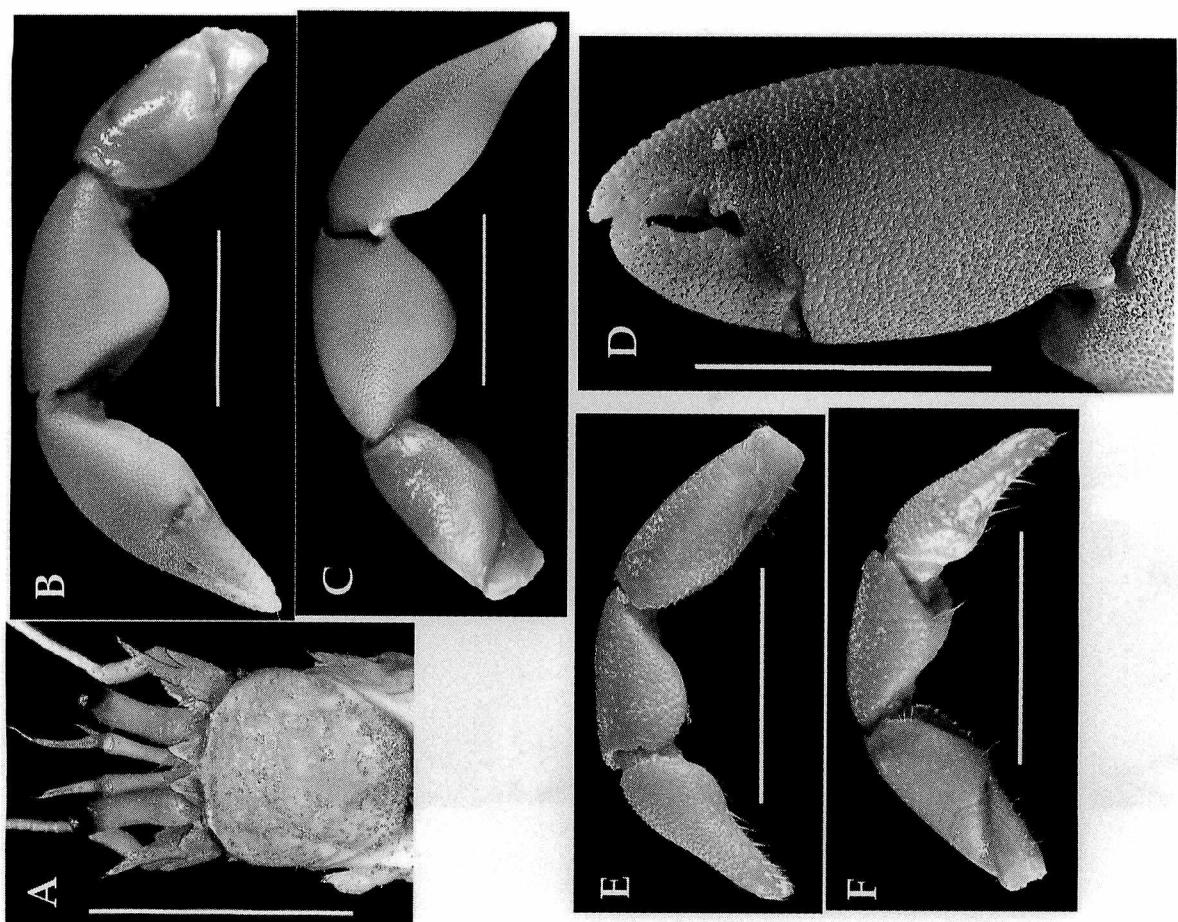


Fig. 33. *Pagurus middendorffii* Brandt, 1851: ♂, SL = 4.20 mm, Shakotan Peninsula, Hokkaido. A, shield and cephalic appendages, dorsal; B, right cheliped, mesial; C, same, lateral; D, same, chela, dorsal; E, left cheliped, lateral; F, same, mesial. Scales equal 5 mm.

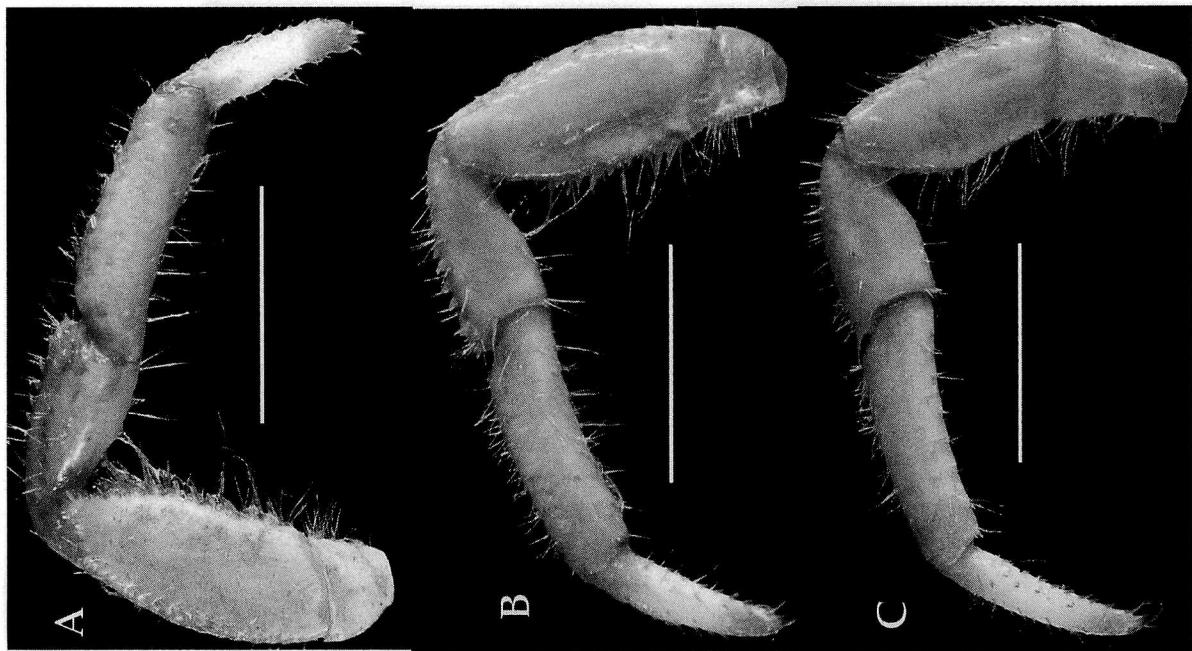


Fig. 36. *Pagurus filholi* De Man, 1887: ♂, SL = 6.90 mm, Takaoka-shi, Toyama-ken, TOYA Z87-17-b. A, right second pereopod, lateral; B, same, mesial; C, right third pereopod, mesial. Scales equal 5 mm.

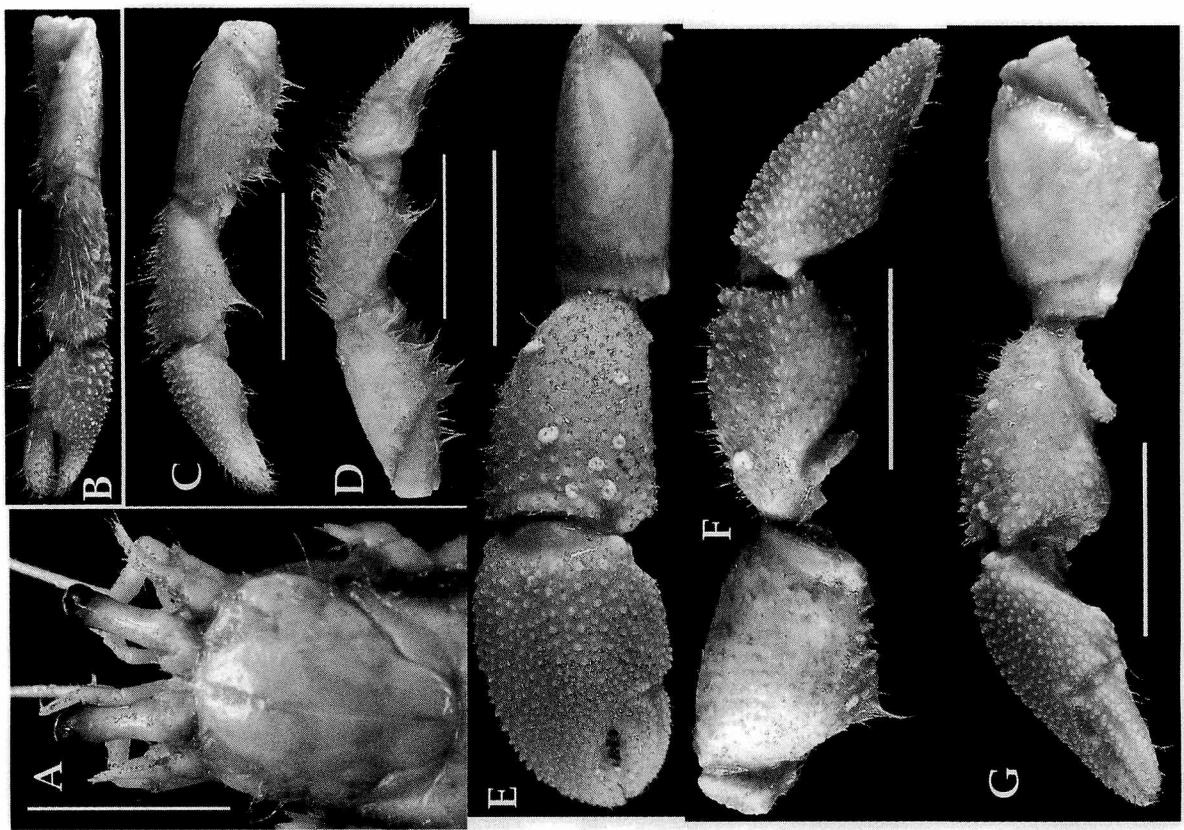


Fig. 35. *Pagurus filholi* De Man, 1887: ♂, SL = 6.90 mm, Takaoka-shi, Toyama-ken, TOYA Z87-17-b. A, shield and cephalic appendages, dorsal; B, left cheliped, dorsal; C, same, lateral; D, same, mesial; E, right cheliped, dorsal; F, same, lateral; G, same, mesial. Scales equal 5 mm.



Fig. 37. *Pagurus minutus* Hess, 1865: ♂, SL = 5.70 mm, Amanohashidate, Kyoto-fu, CBM-ZC 8464. A, shield and cephalic appendages, dorsal; B, left cheliped, dorsal; C, same, mesial; D, right cheliped, dorsal; E, same, lateral; F, same, mesial. Scales equal 5 mm.



Fig. 38. *Pagurus minutus* Hess, 1865: ♂, SL = 5.70 mm, Amanohashidate, Kyoto-fu, CBM-ZC 8464. A, right second pereopod, lateral; B, same, dactyl, propodus and carpus, mesial; C, right third pereopod, lateral; D, same, dactyl, mesial; E, same, carpus, mesial. Scales equal 5 mm.

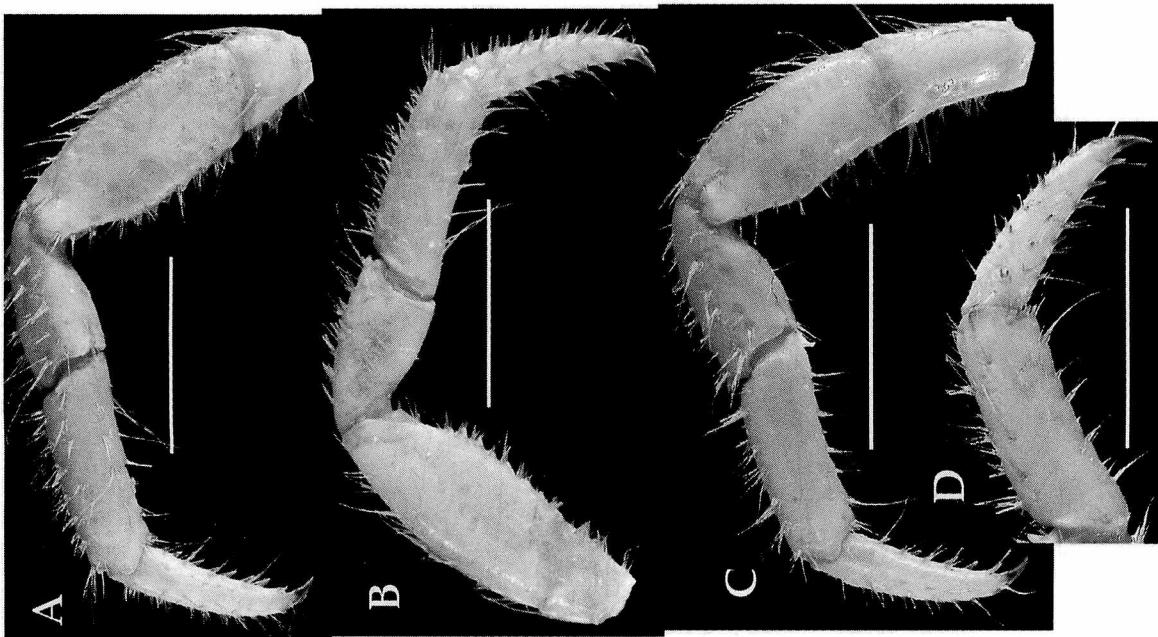


Fig. 40. *Pagurus lanuginosus* De Haan, 1849: ♂, SL = 7.55 mm, Himi-shi, Toyama-ken, TOYA Z78-59-a. A, left second pereopod, lateral; B, same, mesial; C, left third pereopod, lateral; D, same, dactyl and propodus, mesial. Scales equal 5 mm.

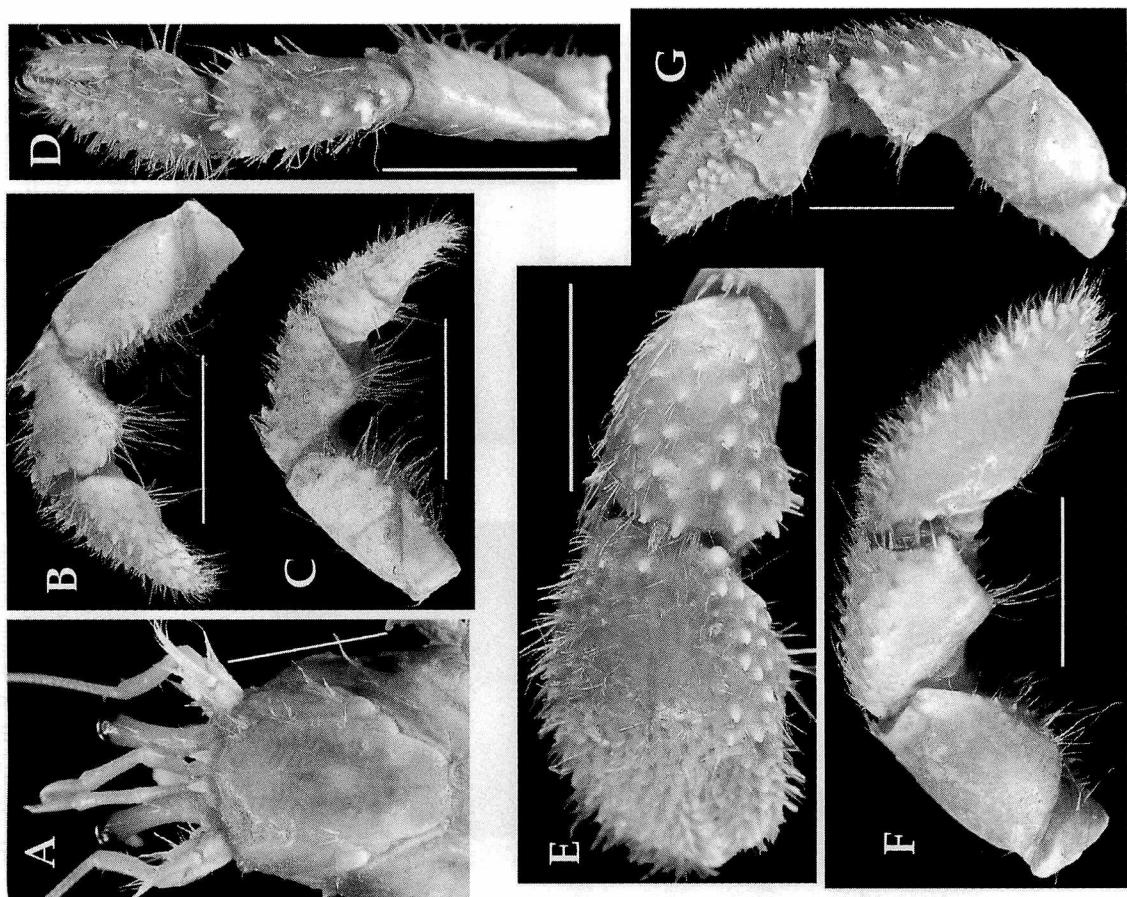


Fig. 39. *Pagurus lanuginosus* De Haan, 1849: ♂, SL = 7.55 mm, Himi-shi, Toyama-ken, TOYA Z78-59-a. A, shield and cephalic appendages, dorsal; B, left cheliped, lateral; C, same, mesial; D, same, dorsal; E, right cheliped, chela and carpus, dorsal; F, same, lateral; G, same, mesial. Scales equal 5 mm.

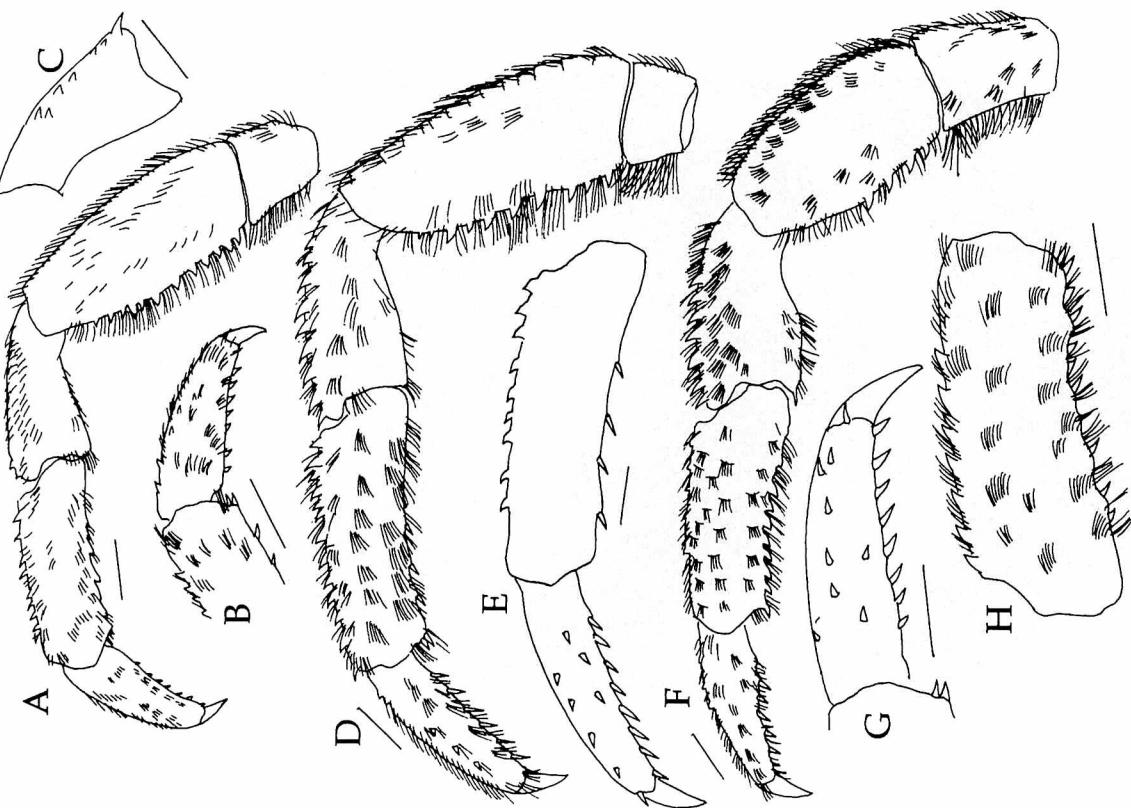


Fig. 42. *Pagurus nigrofascia* Komai, 1996: ♂, SL = 5.55 mm, Tsukumo Bay, Noto Peninsula, OMNH Ar 2135-2136. A, left second pereopod, lateral; B, same, dactyl and distal portion of propodus, mesial; C, same, carpus, mesial; D, right second pereopod, mesial; E, same, dactyl and propodus, mesial; F, left third pereopod, lateral; G, same, dactyl and distal margin of propodus, mesial; H, same, propodus, mesial. Setae omitted in C, E, G. Scales equal 1 mm.

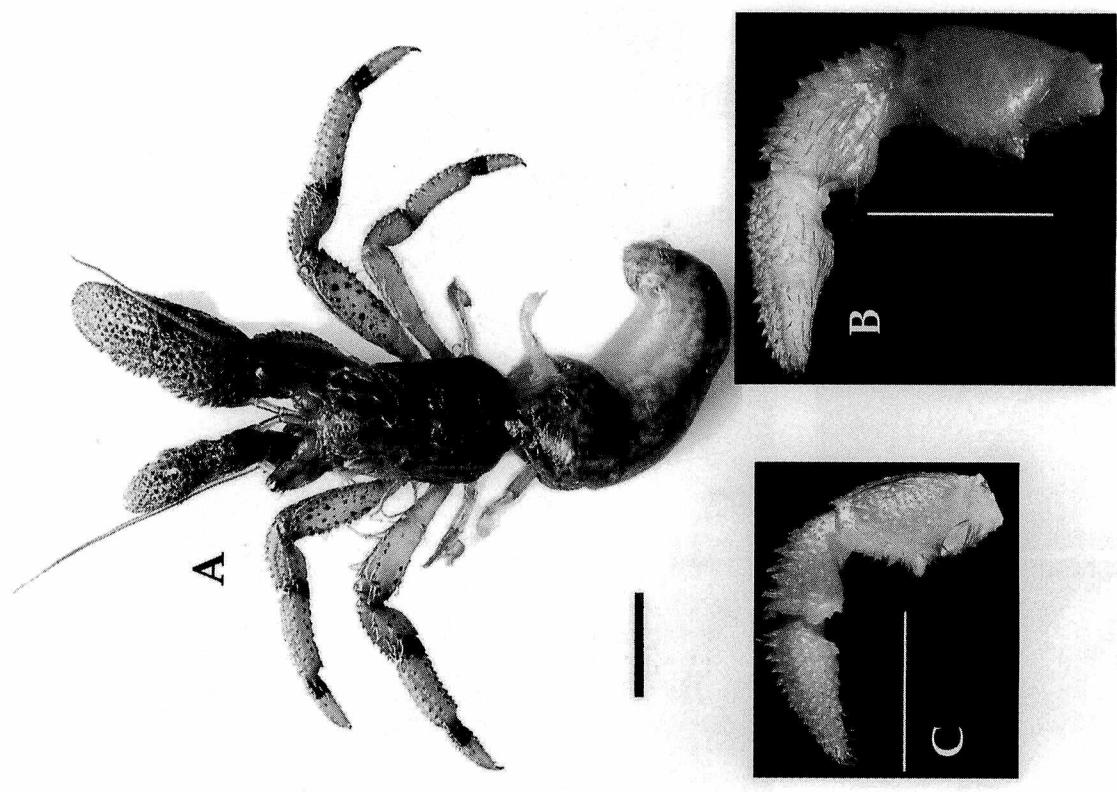


Fig. 41. *Pagurus nigrofascia* Komai, 1996: A, ♂, Fukuoka-ken, photo and copyright by Shinji Mishima; B, C, ♂, SL = 5.55 mm, Tsukumo Bay, Noto Peninsula, OMNH Ar 2135-2136. A, whole animal; B, right cheliped, mesial; C, left cheliped, lateral. Scales equal 5 mm.

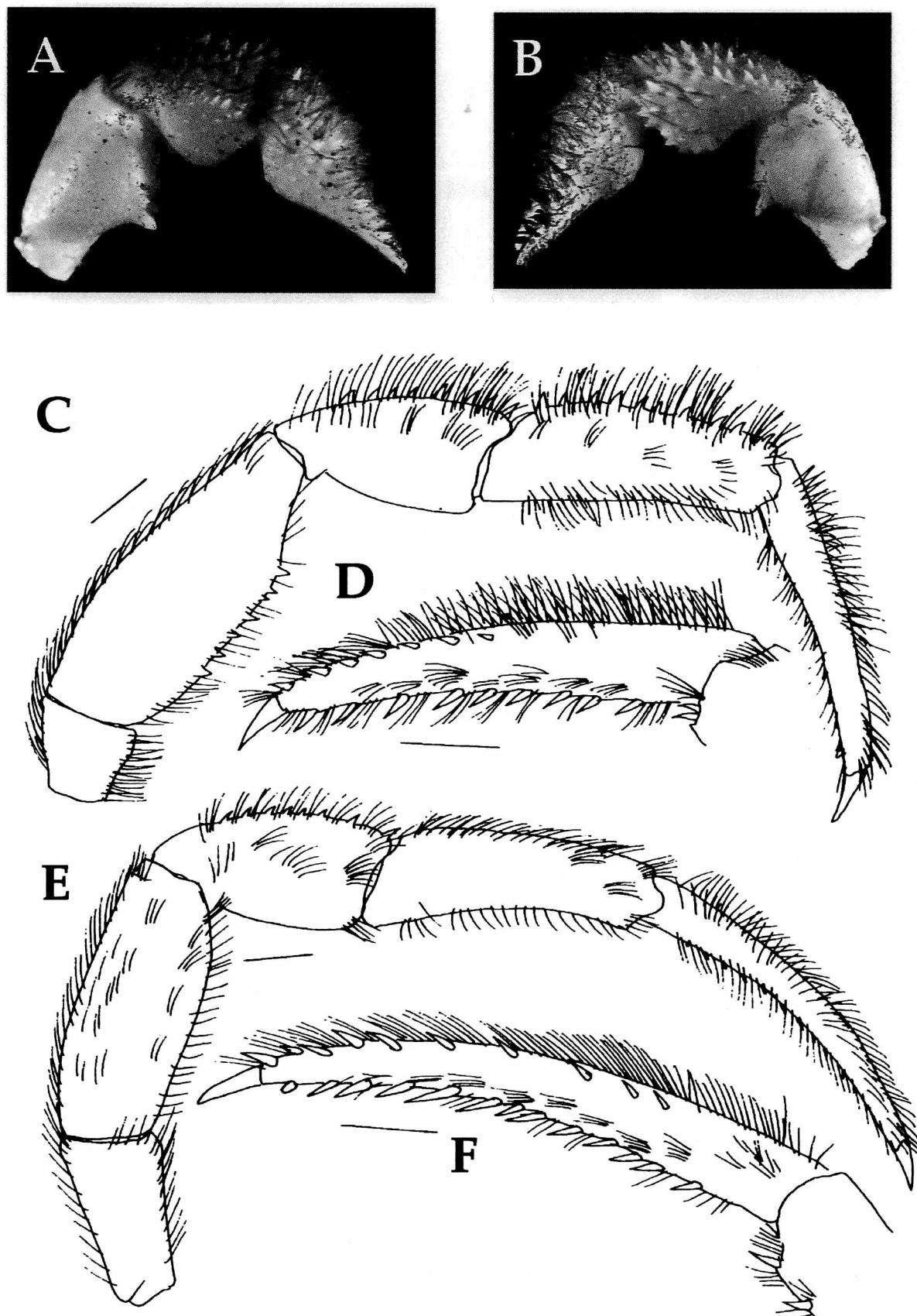


Fig. 43. *Pagurus constans* (Stimpson, 1858): ♀, SL = 5.10 mm, Nishihama, Yamagata-ken, YPM-SS 1546. A, right cheliped, lateral; B, same, mesial; C, right second pereopod, lateral; D, same, dactyl and distal margin of propodus, mesial; E, right third pereopod, lateral; F, same, dactyl and distal margin of propodus, mesial. Scales equal 1 mm.

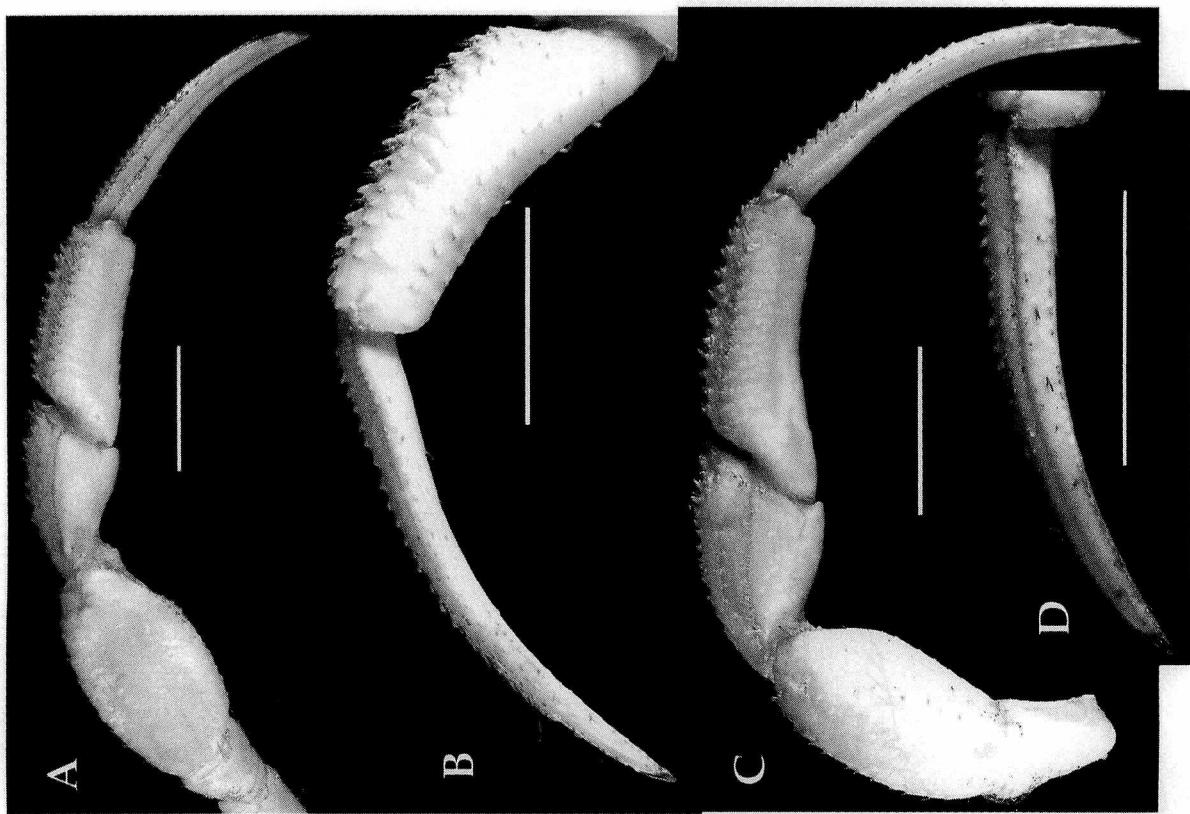


Fig. 45. *Pagurus gracilipes* (Stimpson, 1858): ♀, SL = 8.00 mm, Toyama-shi, TOYA Z90-21-b. A, right second pereopod, lateral; B, same, dactyl and propodus, mesial; C, right third pereopod, lateral; D, same, dactyl, mesial. Scales equal 5 mm.

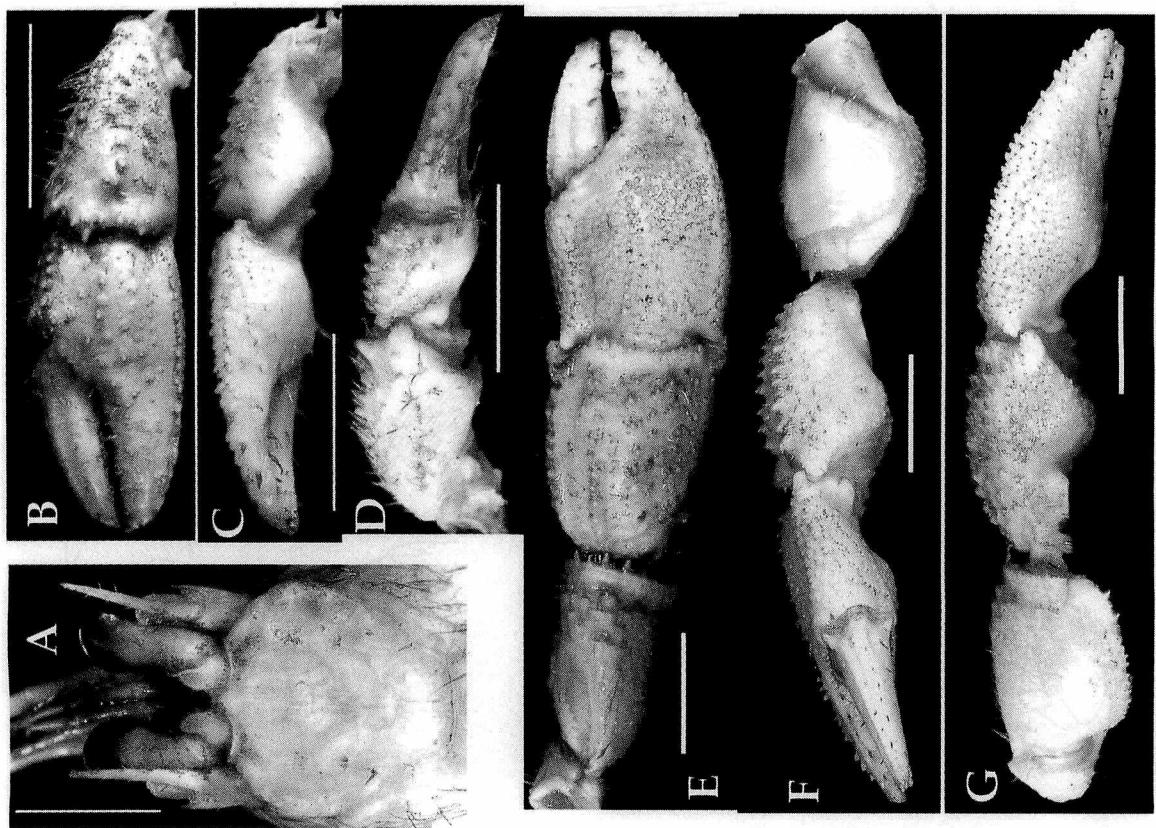


Fig. 44. *Pagurus gracilipes* (Stimpson, 1858): ♀, SL = 8.00 mm, Toyama-shi, TOYA Z90-21-b. A, shield and cephalic appendages, dorsal; B, cheila of left cheliped, dorsal; C, same, lateral; D, same, mesial; E, right cheliped, dorsal; F, same, mesial; G, same, lateral. Scales equal 5 mm.

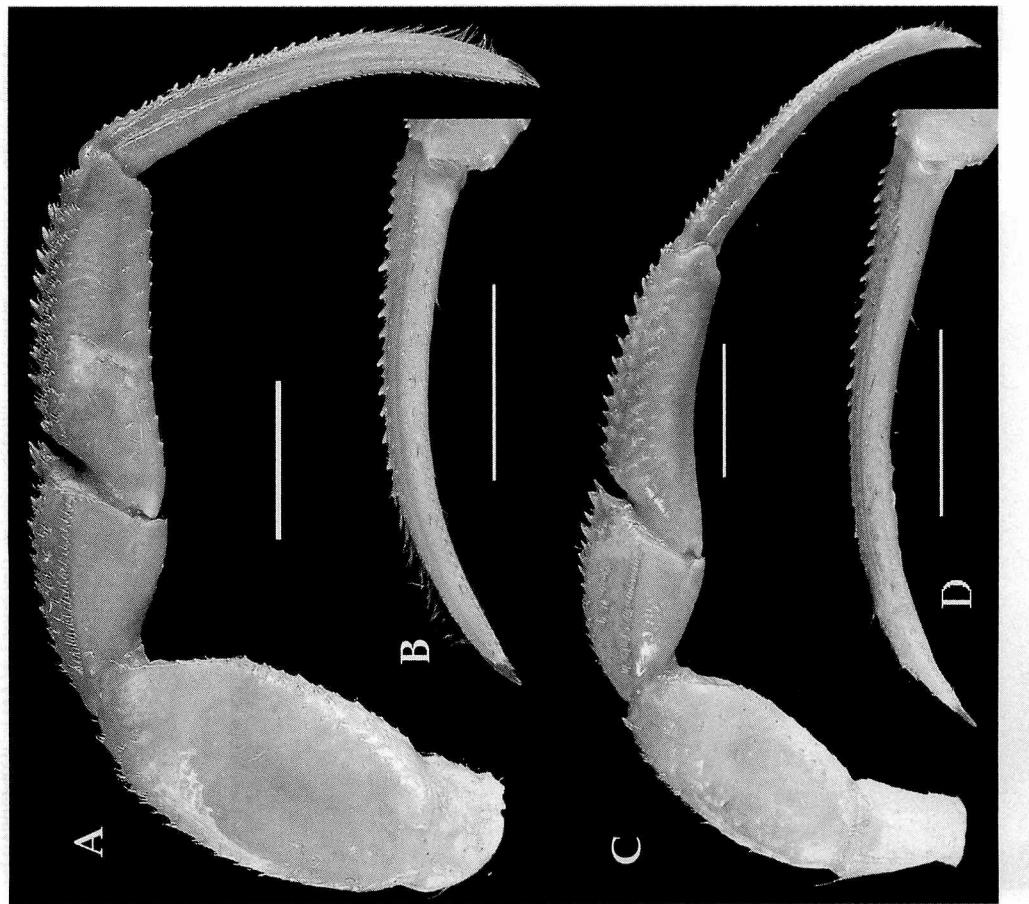


Fig. 47. *Pagurus nipponensis* (Yokoya, 1933): ♂, SL = 6.90 mm, Miyazu-shi, Kyoto-fu, CBM-ZC 8450. A, right second pereopod, lateral; B, same, dactyl, mesial; C, right third pereopod, lateral; D, same, dactyl, mesial. Scales equal 5 mm.

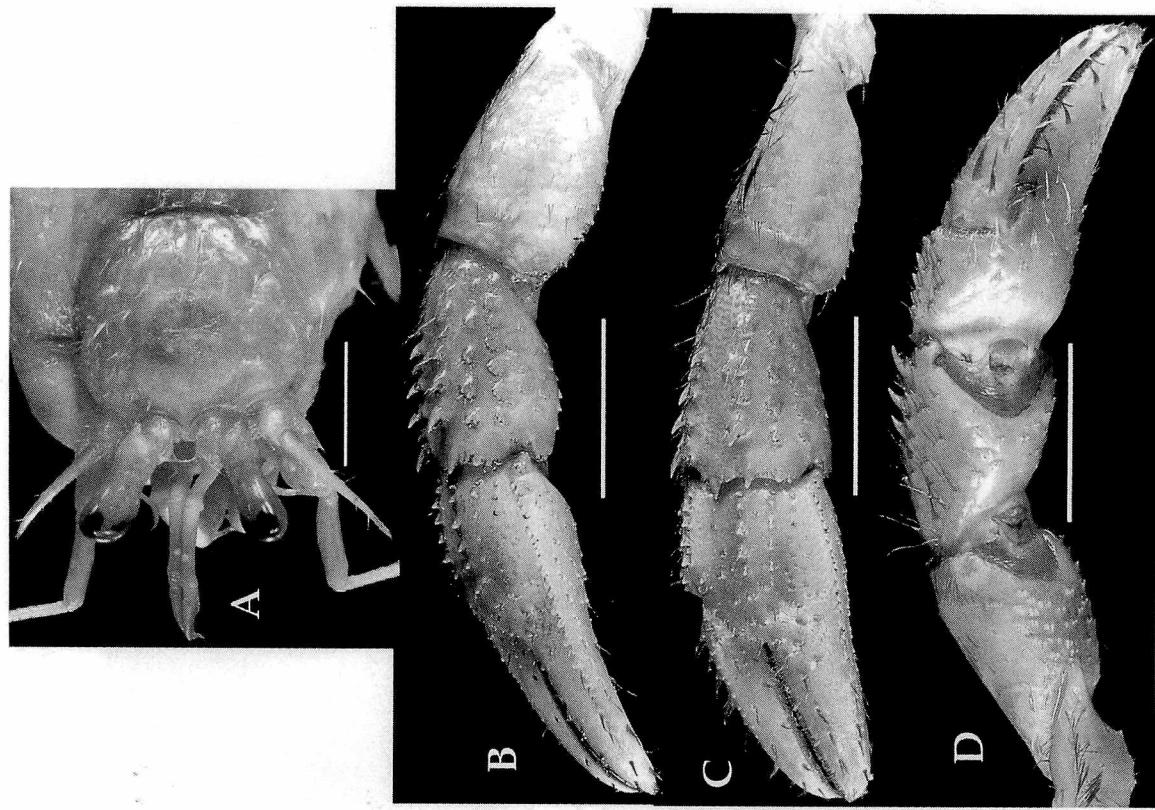


Fig. 46. *Pagurus nipponensis* (Yokoya, 1933): ♂, SL = 6.90 mm, Miyazu-shi, Kyoto-fu, CBM-ZC 8450. A, shield and cephalic appendages, dorsal; B, left cheliped, lateral (slightly dorsally); C, same, mesial; D, same, mesial (slightly ventral). Scales equal 5 mm.

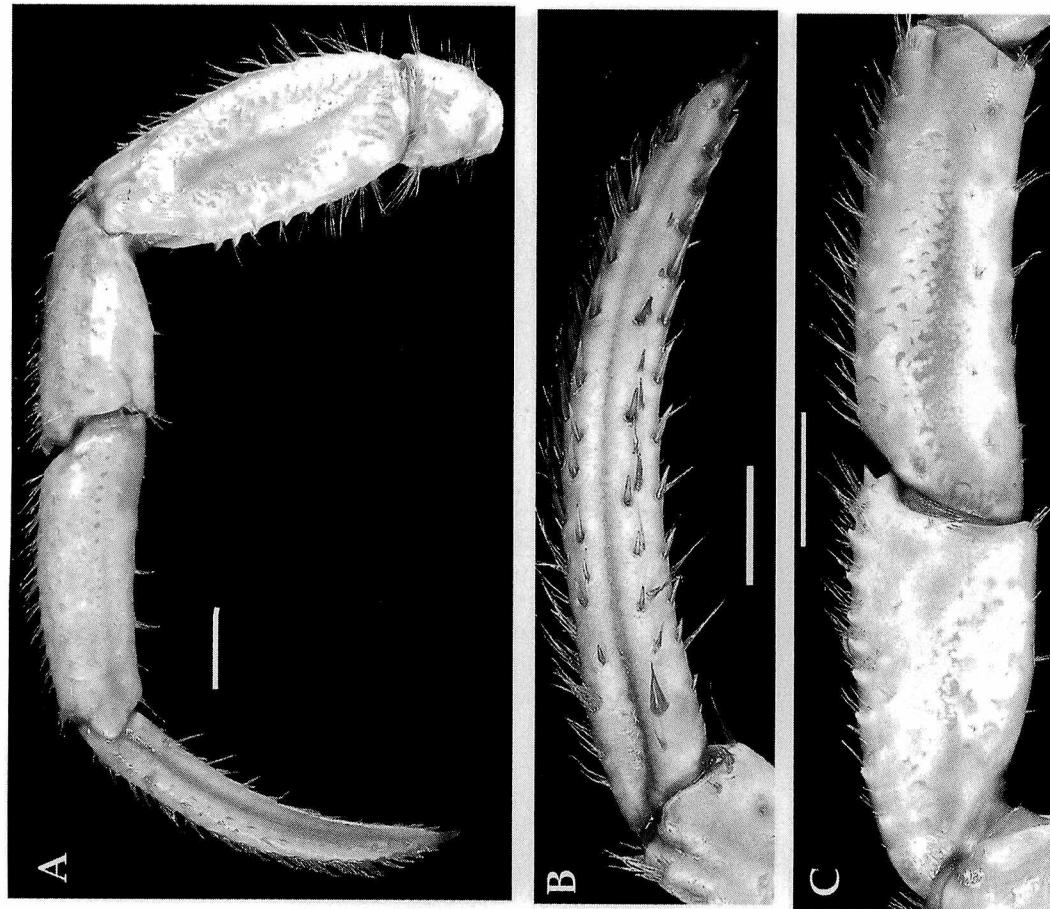


Fig. 49. *Pagurus trigonocheirus* (Stimpson, 1858): ♂, SL = 18.65 mm, Toyama Bay, Toyama-ken, TOYA Z88-28-b. A, left second pereopod, lateral; B, same, dactyl, mesial; C, same, propodus and carpus, mesial.

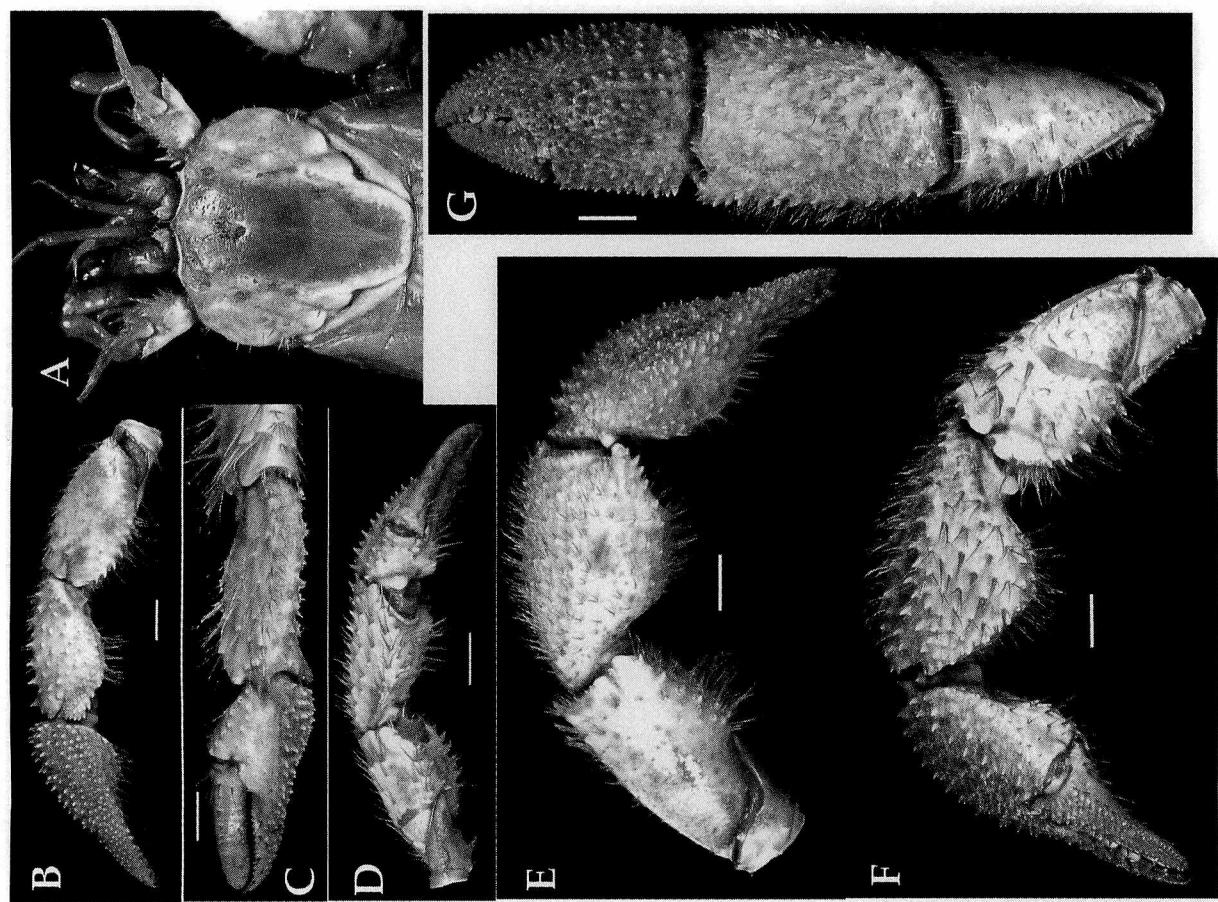


Fig. 48. *Pagurus trigonocheirus* (Stimpson, 1858): ♂, SL = 18.65 mm, Toyama Bay, Toyama-ken, TOYA Z88-28-b. A, shield and cephalic appendages, dorsal; B, left cheliped, lateral; C, same, dorsal; D, same, mesial; E, right cheliped, lateral; F, same, mesial; G, same, dorsal. Scales equal 5 mm.

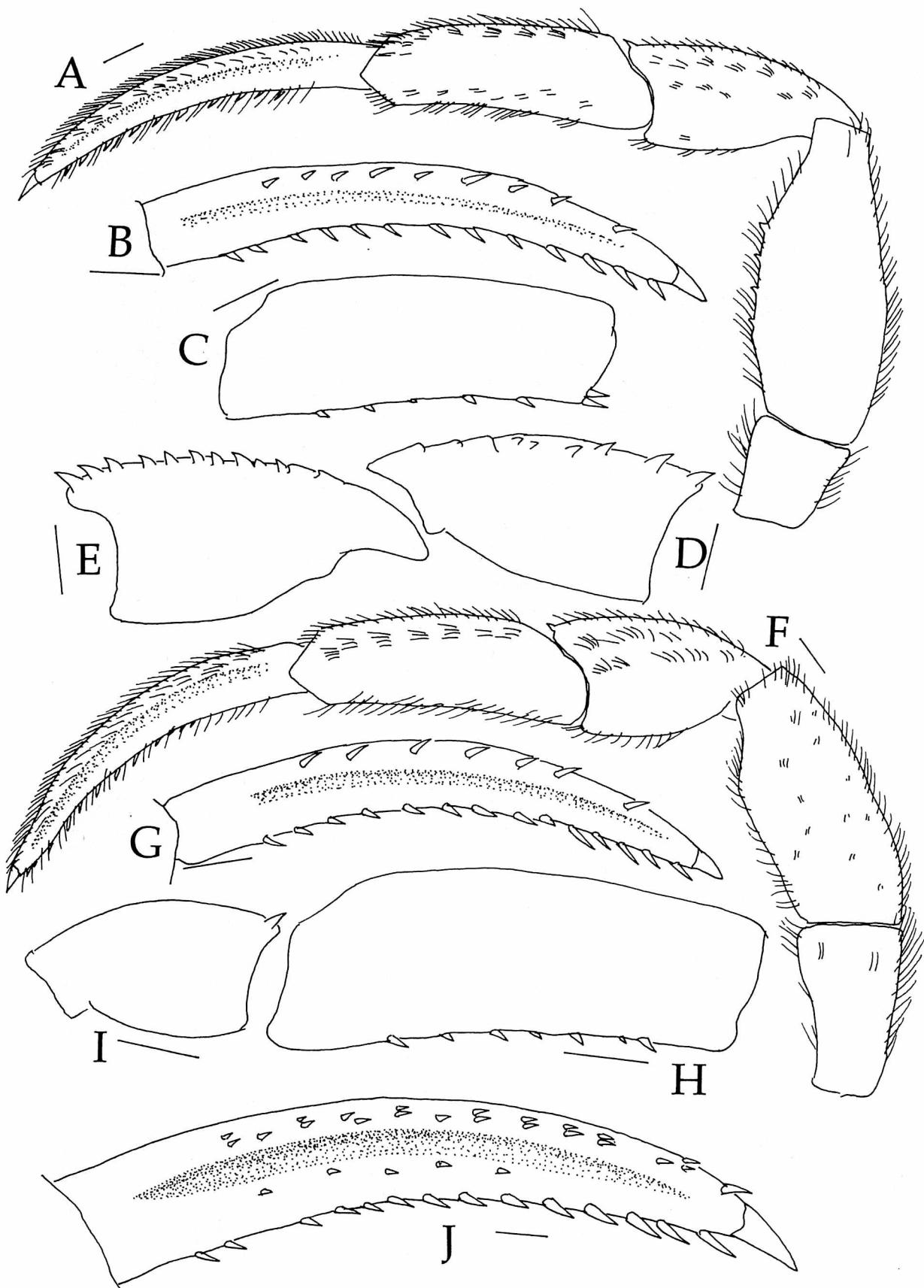


Fig. 50. *Pagurus trigonocheirus* (Stimpson, 1858): A-I, ♂, SL = 5.95 mm, Toyama Bay, Toyama-ken, TOYA Z88-1; J, ♂, SL = 12.80 mm, SBL-H-8, Bering Sea, acc. no. 282239, USNM. A, left second pereopod, lateral; B, same, dactyl, mesial; C, same, propodus, mesial; D, same, carpus, mesial; E, right second pereopod, carpus, mesial; F, left third pereopod, lateral; G, same, dactyl, mesial; H, same, propodus; I, carpus, mesial; J, left second pereopod, dactyl, mesial. Setae omitted in B-E, G-J. Scales equal 1 mm.



Fig. 52. *Pagurus Rathbuni* (Benedict, 1892): ♂, SL = 6.20 mm, Toyama-shi, Toyama-ken, TOYA Z90-61. A, left second pereopod, lateral; B, same, dactyl and propodus, mesial; C, left third pereopod, lateral; D, same, dactyl and propodus, mesial. Scales equal 5 mm.

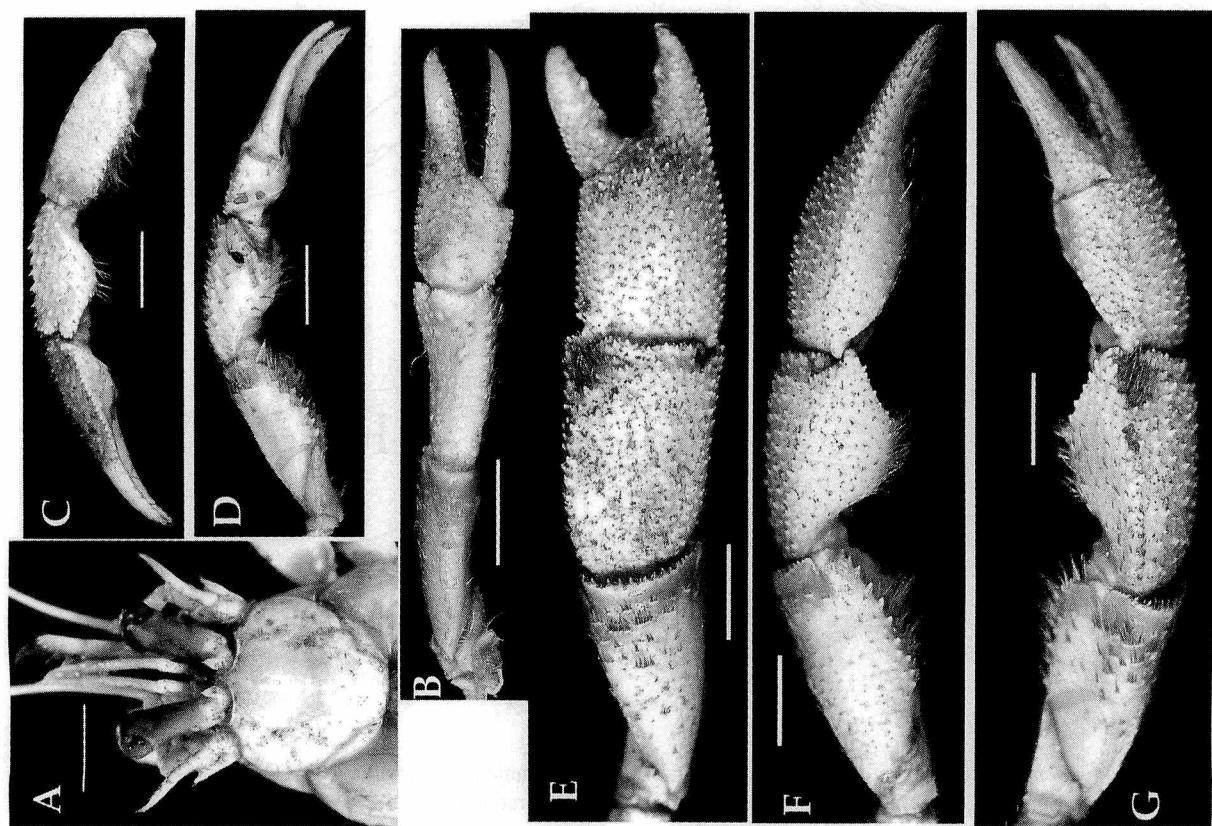


Fig. 51. *Pagurus Rathbuni* (Benedict, 1892): ♂, SL = 6.20 mm, Toyama-shi, Toyama-ken, TOYA Z90-61. A, shield and cephalic appendages, dorsal; B, left cheliped, dorsal; C, same, lateral; D, same, mesial; E, right cheliped, dorsal; F, same, lateral; G, same, mesial. Scales equal 5 mm.

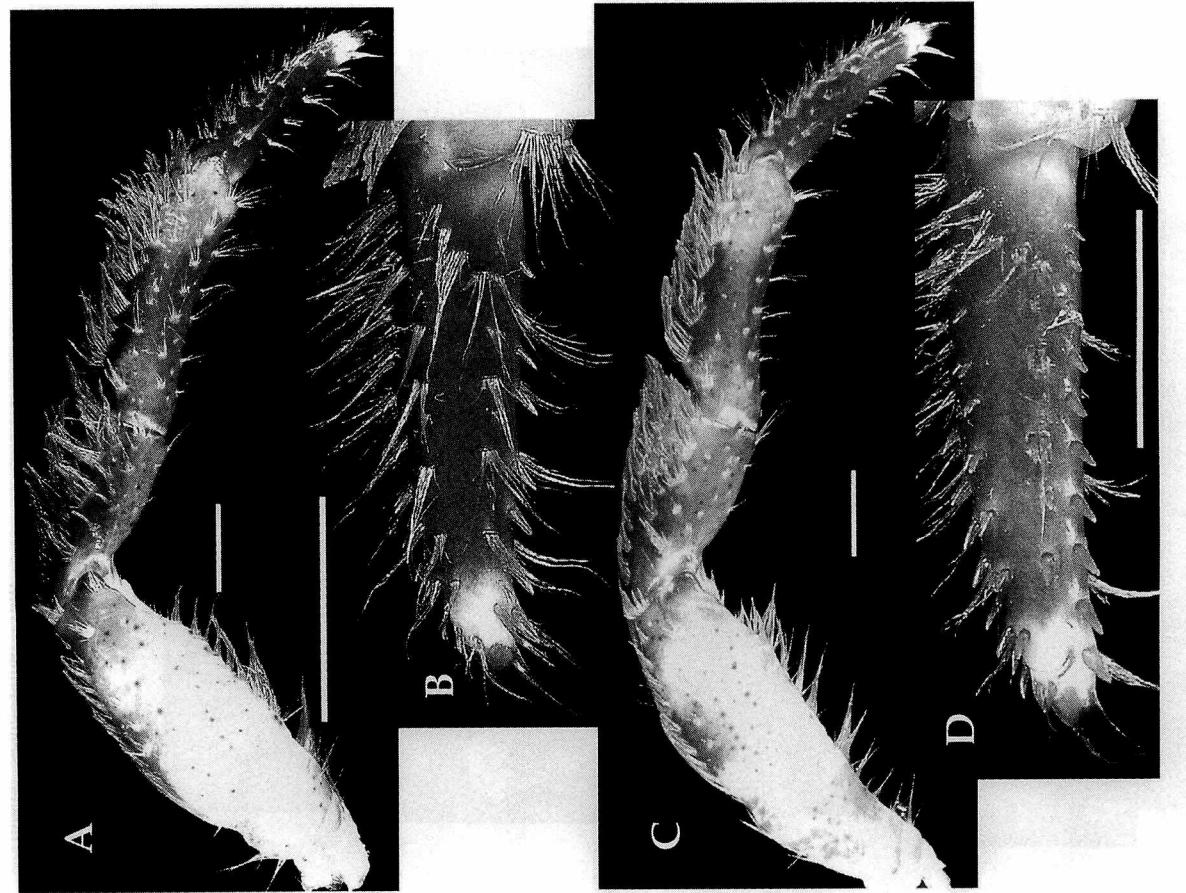


Fig. 54. *Pagurus japonicus* (Stimpson, 1858): ♂, SL = 18.30 mm, Miyazu-shi, Kyoto-fu, CBM-ZC 8459. A, right second pereopod, lateral; B, same, dactyl, mesial; C, right third pereopod, lateral; D, same, dactyl, mesial. Scales equal 5 mm.

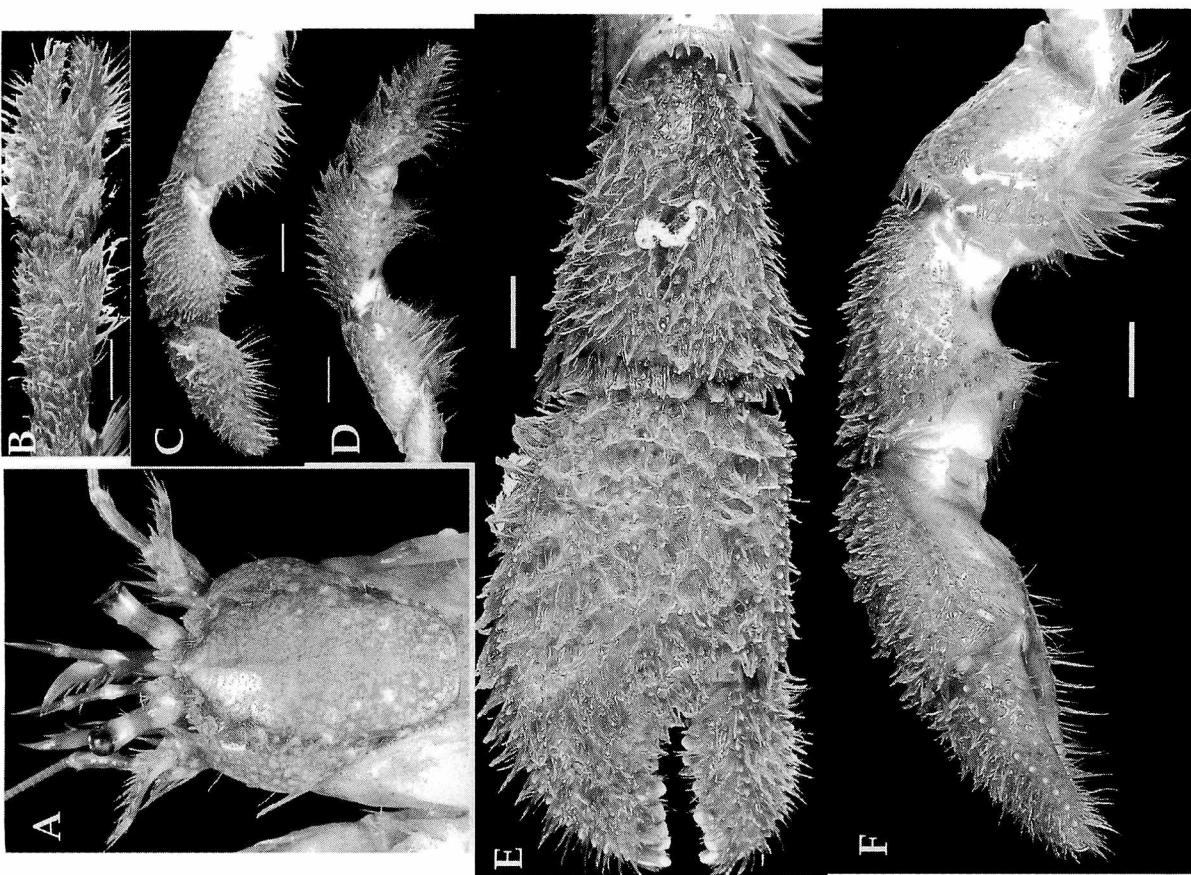


Fig. 53. *Pagurus japonicus* (Stimpson, 1858): ♂, SL = 18.30 mm, Miyazu-shi, Kyoto-fu, CBM-ZC 8459. A, shield and cephalic appendages, dorsal; B, left cheliped, chela and carpus, dorsal; C, same, lateral; D, same, mesial; E, right cheliped, chela and carpus, dorsal; F, same, mesial. Scales equal 5 mm.



Fig. 56. *Pagurus rubrior* Komai, 2003: ♂, SL = 11.55 mm, Miyazu-shi, Kyoto-fu, CBM-ZC 8454. A, left cheliped, dorsal (slightly lateral); B, same, lateral; C, same, medial; D, right third pereopod, lateral; E, same, dactyl and distal half of propodus, medial. Scales equal 5 mm.



Fig. 55. *Pagurus rubrior* Komai, 2003: ♂, SL = 11.55 mm, Miyazu-shi, Kyoto-fu, CBM-ZC 8454. A, shield and cephalic appendages, dorsal; B, right cheliped, cheila and carpus, dorsal; C, same, lateral; D, same, medial. Scales equal 5 mm.

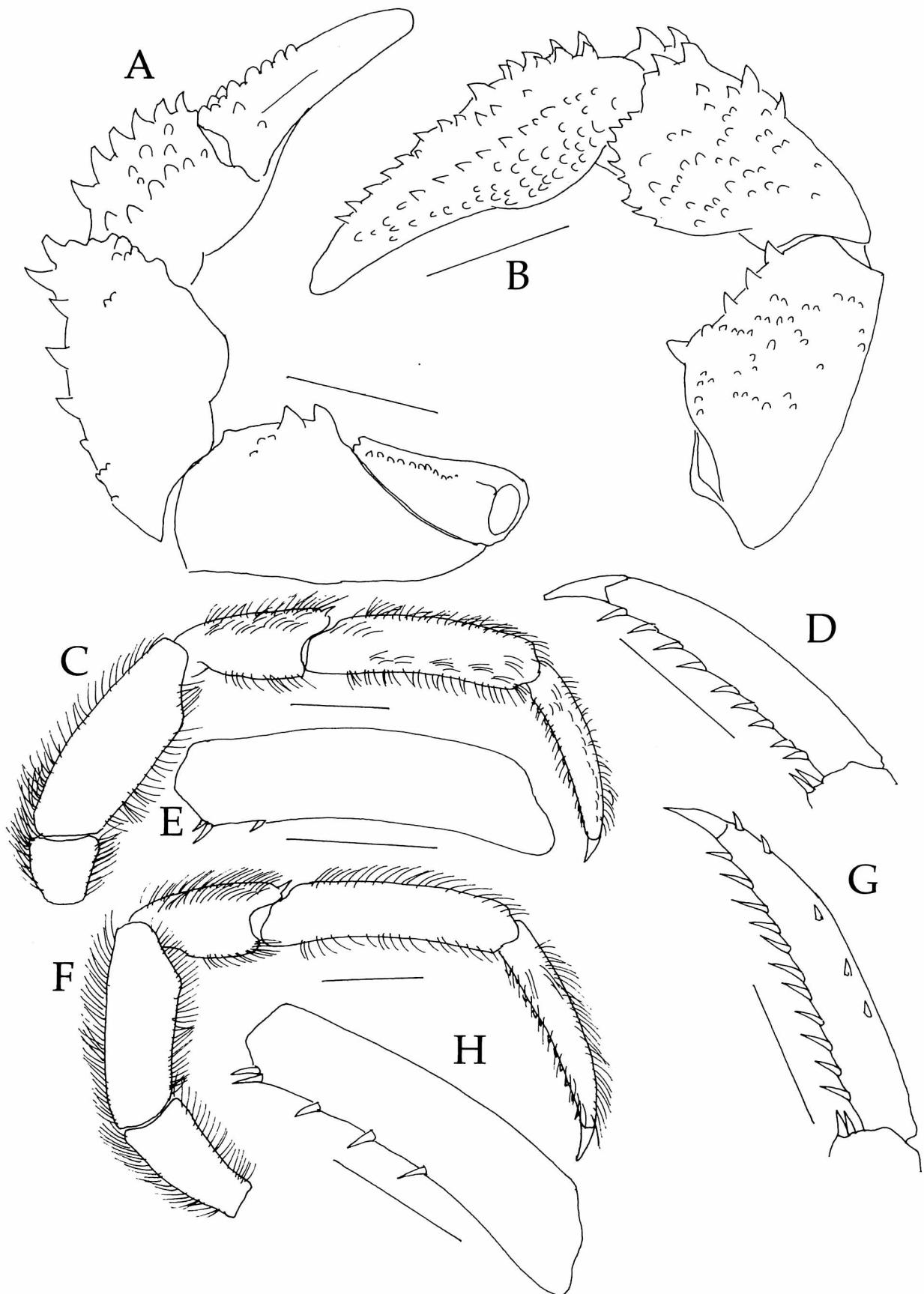


Fig. 57. *Pagurus* cf. *nigrivittatus*: ♀, SL = 2.75 mm, Kanmuri-jima Island, Kyoto-fu, CBM-ZC 8468. A, left cheliped, mesial; B, same, lateral; C, right second pereopod, lateral; D, same, dactyl and distal margin of propodus, mesial; E, same, propodus, mesial; F, right third pereopod, lateral; G, same, dactyl and distal margin of propodus, mesial; H, propodus, mesial. Setae omitted in A, B, D, E, G, and H. Scales equal 1 mm.

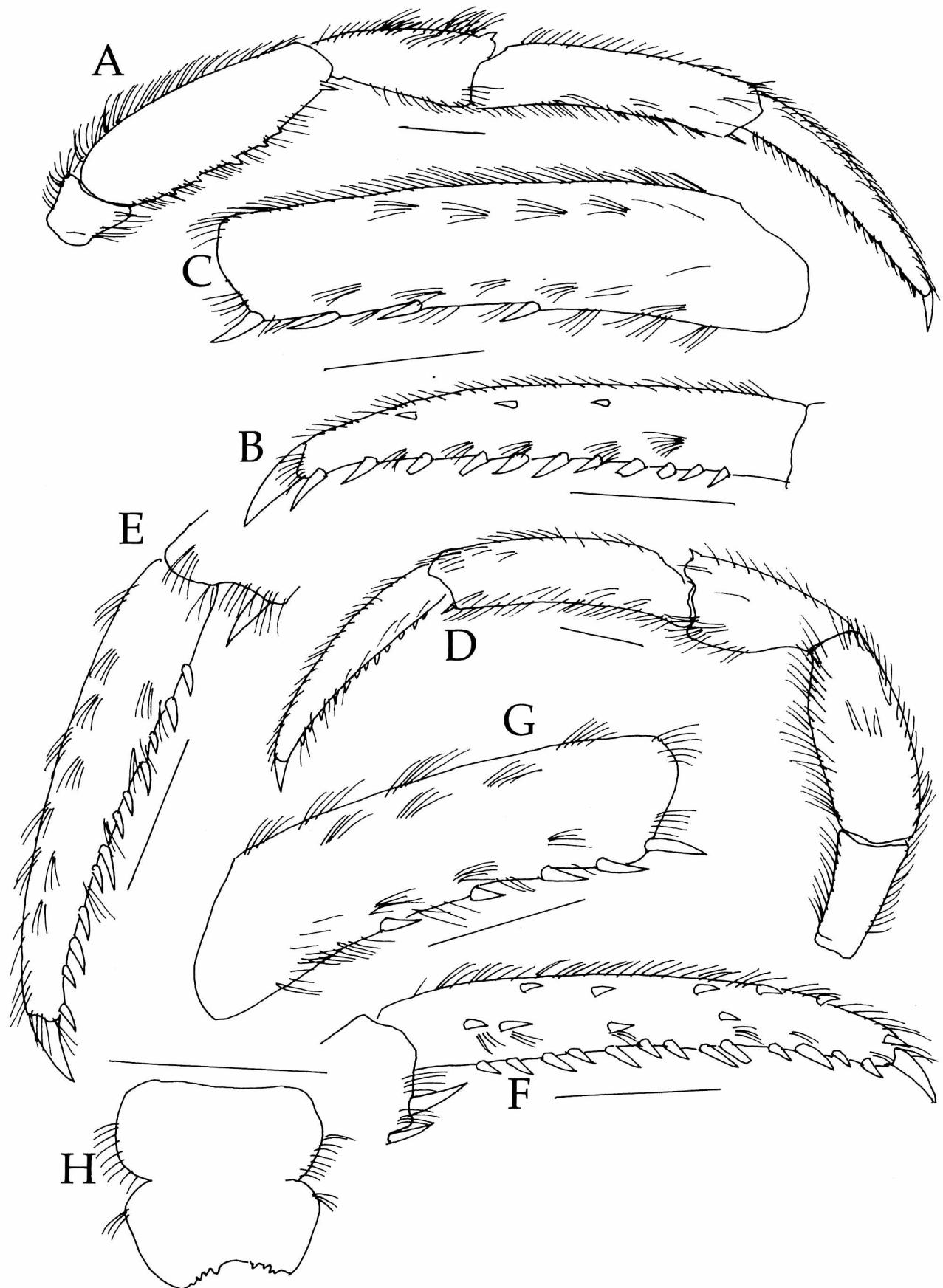


Fig. 58. *Pagurus quinquelineatus* Komai, 2003: ♂, SL = 2.90 mm, Kanmuri-jima Island, Kyoto-fu, CBM-ZC 8467. A, right second pereopod, lateral; B, same, dactyl, mesial; C, same, propodus, mesial; D, left third pereopod, lateral; E, same, dactyl and distal margin of propodus, lateral; F, same, dactyl and distal margin of propodus, mesial; G, same, propodus, mesial; H, telson, dorsal. Scales equal 5 mm.

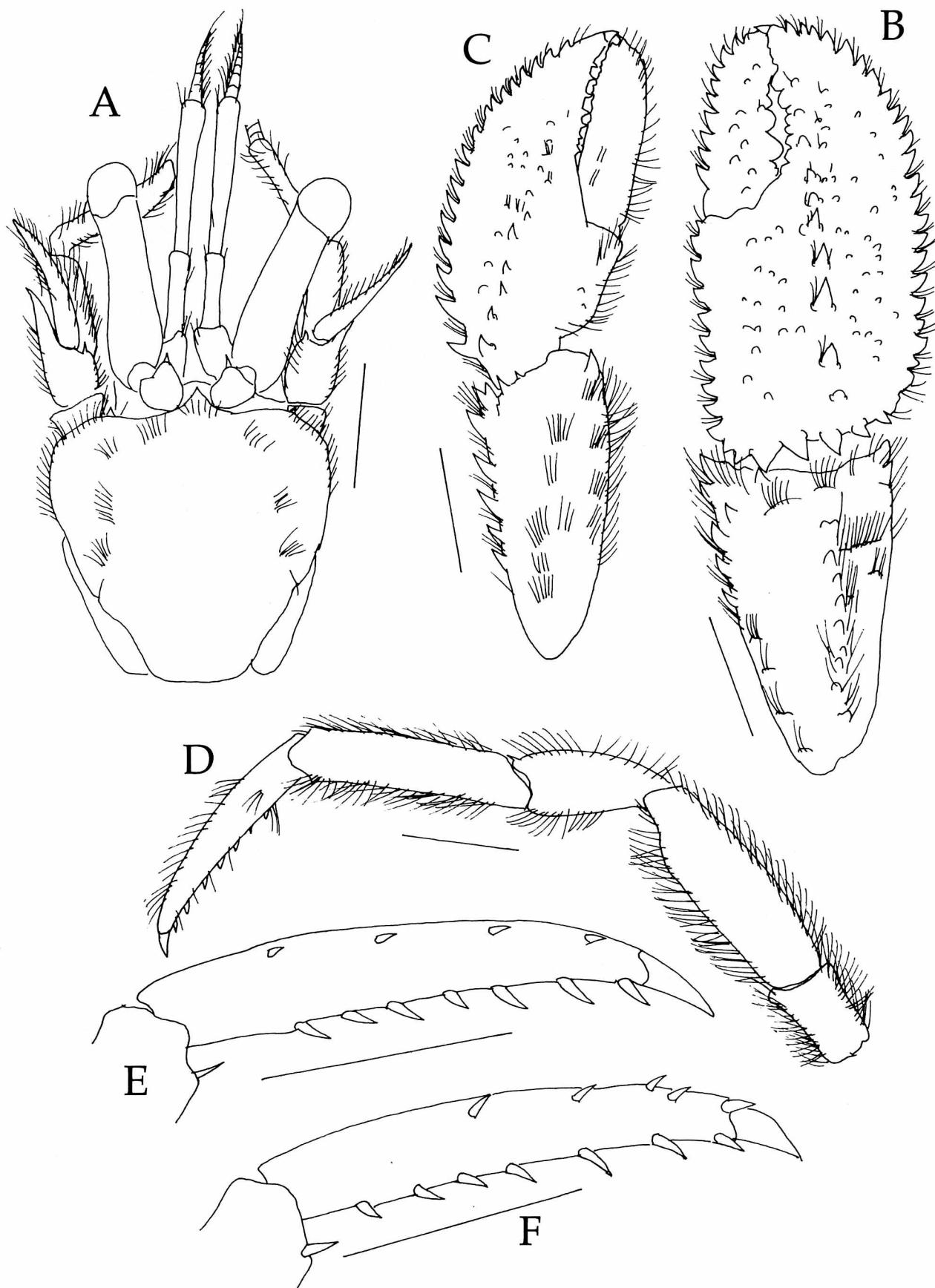


Fig. 59. *Lophopagurus (Australeremus) triserratus* (Ortmann, 1892): ♀, SL = 2.15 mm, Kanmuri-jima Island, Kyoto-fu, CBM-ZC 8462. A, shield and cephalic appendages, dorsal; B, chela and carpus of right cheliped, dorsal; C, chela and carpus of left cheliped, dorsal; D, left second pereopod, lateral; E, same, dactyl and distal margin of propodus, mesial; F, left third pereopod, dactyl and distal margin of propodus, mesial. Setae omitted in E and F. Scales equal 1 mm.

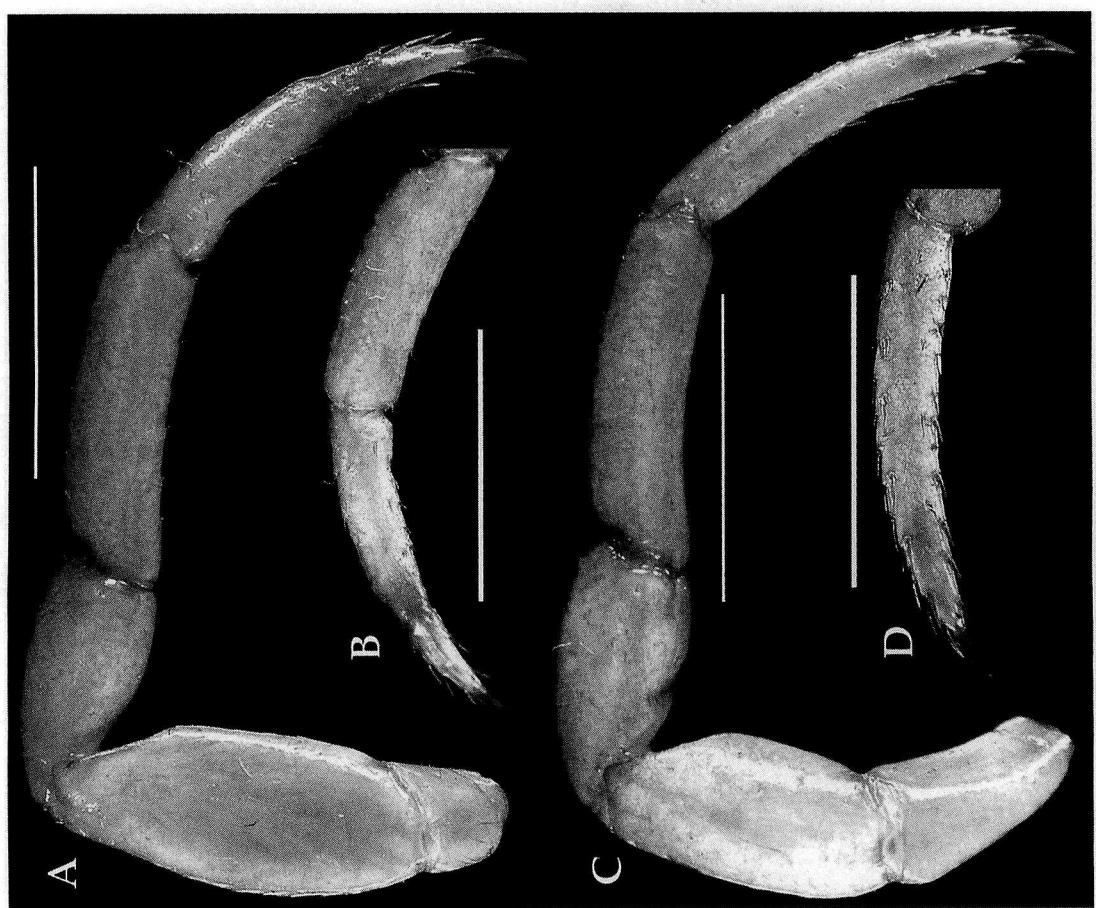


Fig. 61. *Ellassochirus cavimanus* (Miers, 1879): ♂, SL = 6.35 mm, off Shimminato-shi, Toyama-ken, TOYA Z91-54-a. A, right second pereopod, lateral; B, same, dactyl and propodus, mesial; C, right third pereopod, lateral; D, same, dactyl, mesial.

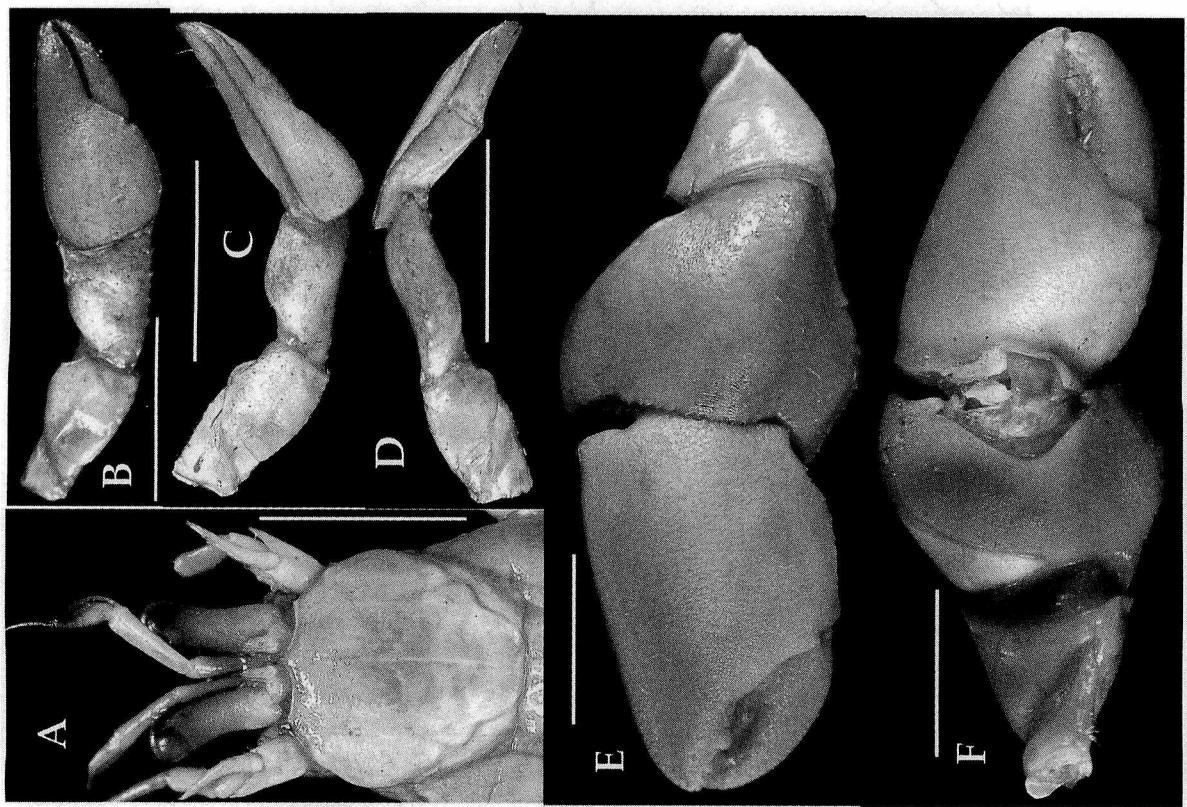


Fig. 60. *Ellassochirus cavimanus* (Miers, 1879): ♂, SL = 6.35 mm, off Shimminato-shi, Toyama-ken, TOYA Z91-54-a. A, shield and cephalic appendages, dorsal; B, left cheliped, dorsal; C, same, lateral; D, same, mesial; E, right cheliped, dorsal; F, same, ventral. Scales equal 5 mm.

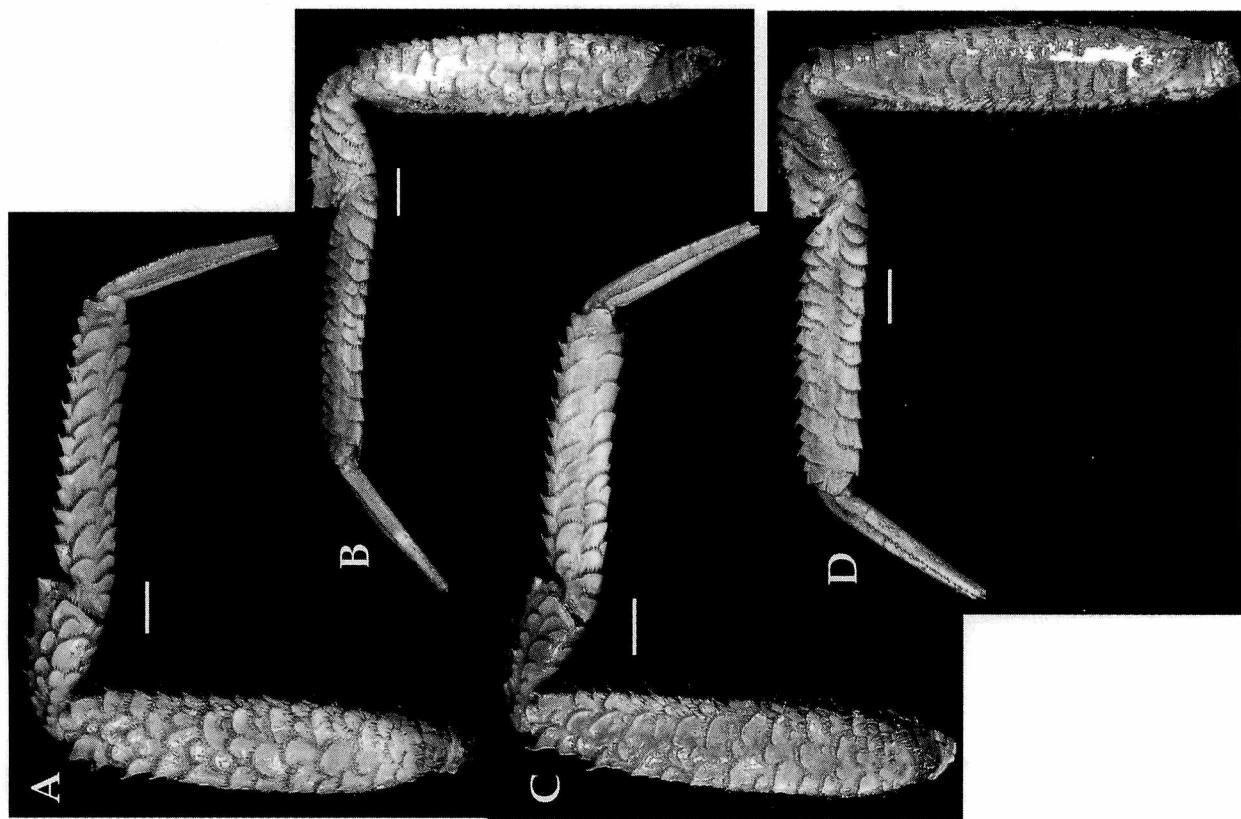


Fig. 63. *Labidochirus anomalous* (Balss, 1913): ♂, SL = 17.45 mm, Ishikawa-ken, KMNH 16801. A, right second pereopod, lateral; B, same, mesial; C, right third pereopod, lateral; D, same, mesial. Scales equal 5 mm.

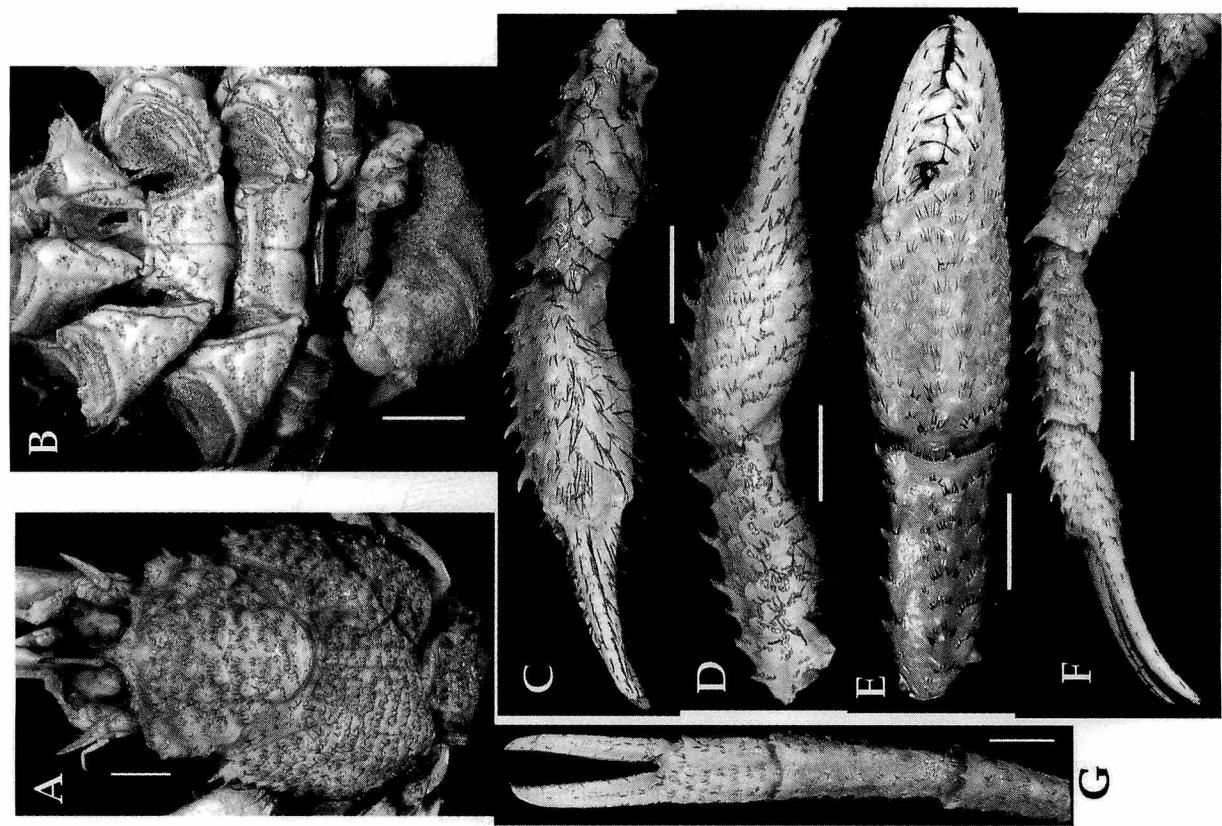


Fig. 62. *Labidochirus anomalous* (Balss, 1913): ♂, SL = 17.45 mm, Ishikawa-ken, KMNH 16801. A, carapace and cephalic appendages, dorsal; B, ventral face of body; C, chela and carpus of right cheliped, mesial; D, same, lateral; E, same, dorsal; F, left cheliped, lateral; G, same, dorsal. Scales equal 5 mm.

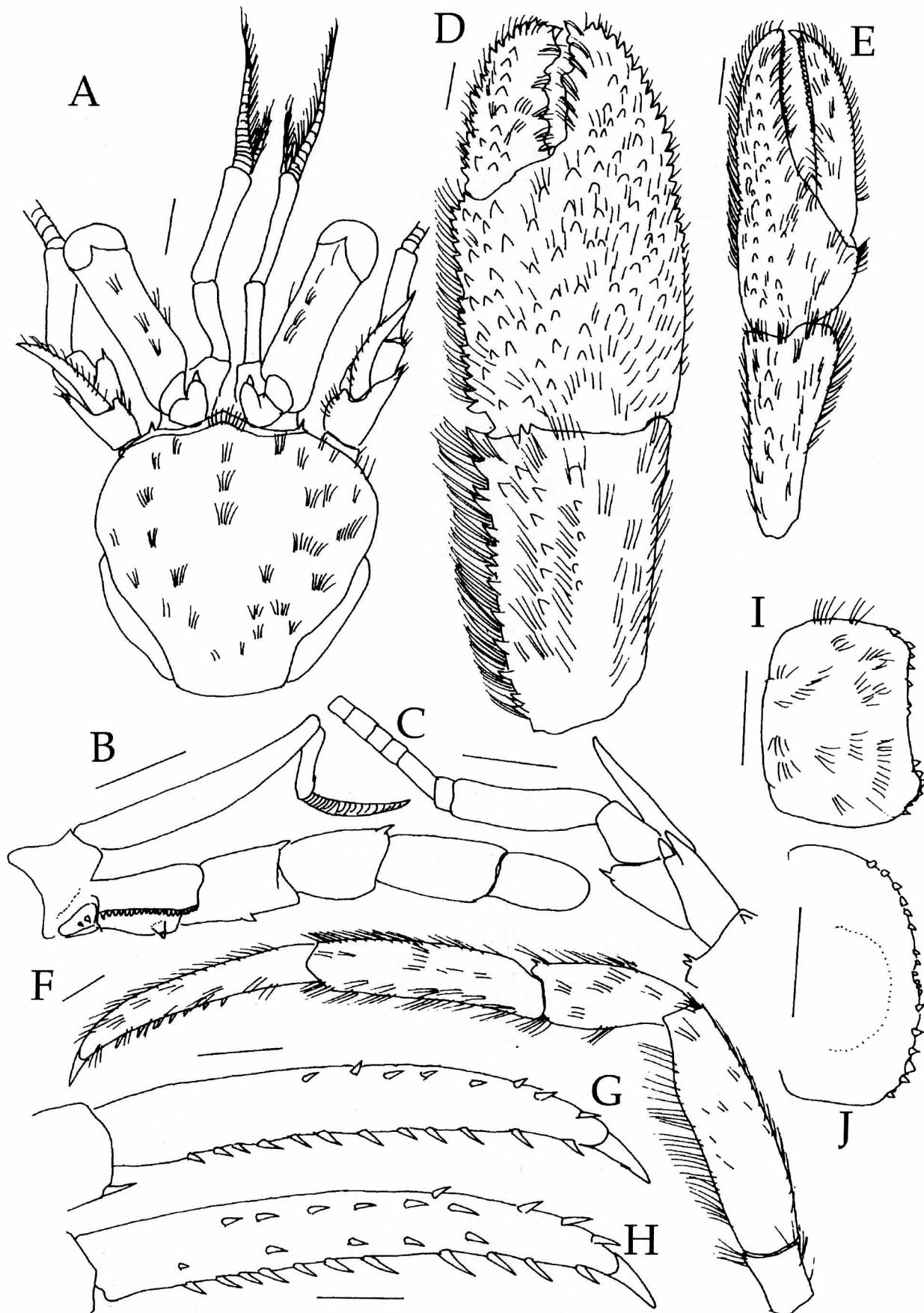


Fig. 64. *Discorsopagurus maclaughlinae* Komai, 1995: ♂, SL = 4.75 mm, Sudzukhe Bay, Russia, USNM 72366. A, shield and cephalic appendages, dorsal; B, left third maxilliped, outer; C, left antennal peduncle, lateral; D, chela and carpus of right cheliped, dorsal; E, chela and carpus of left cheliped, dorsal; F, left second pereopod, lateral; G, same, dactyl and distal margin of propodus, mesial; H, left third pereopod, dactyl and distal margin of propodus, mesial. I, telson, dorsal; J, same, ventral. Scales equal 1 mm

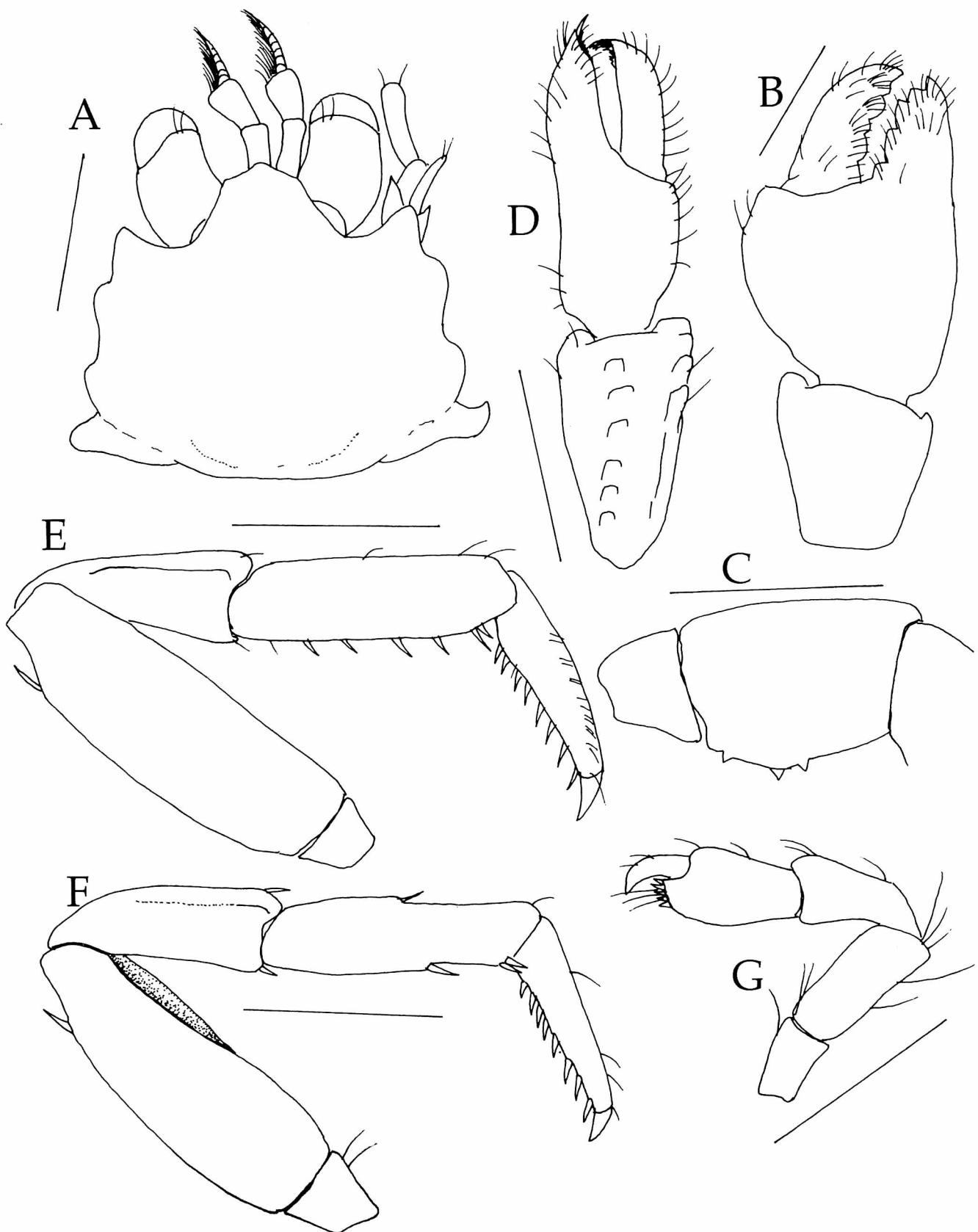


Fig. 65. *Porcellanopagurus nihonkaiensis* Takeda, 1985: ♀, SL = 1.95 mm, Munakata-oshima Island, Fukuoka-ken, ZLKU (KMNH) 7028. A, shield and cephalic appendages, dorsal; B, chela and carpus of right cheliped, dorsal; C, merus and ischium of right cheliped, lateral; D, chela and carpus of left cheliped, dorsal; E, right second pereopod, lateral; F, right third pereopod, lateral; G, left fourth pereopod, lateral. Scales equal 1 mm.

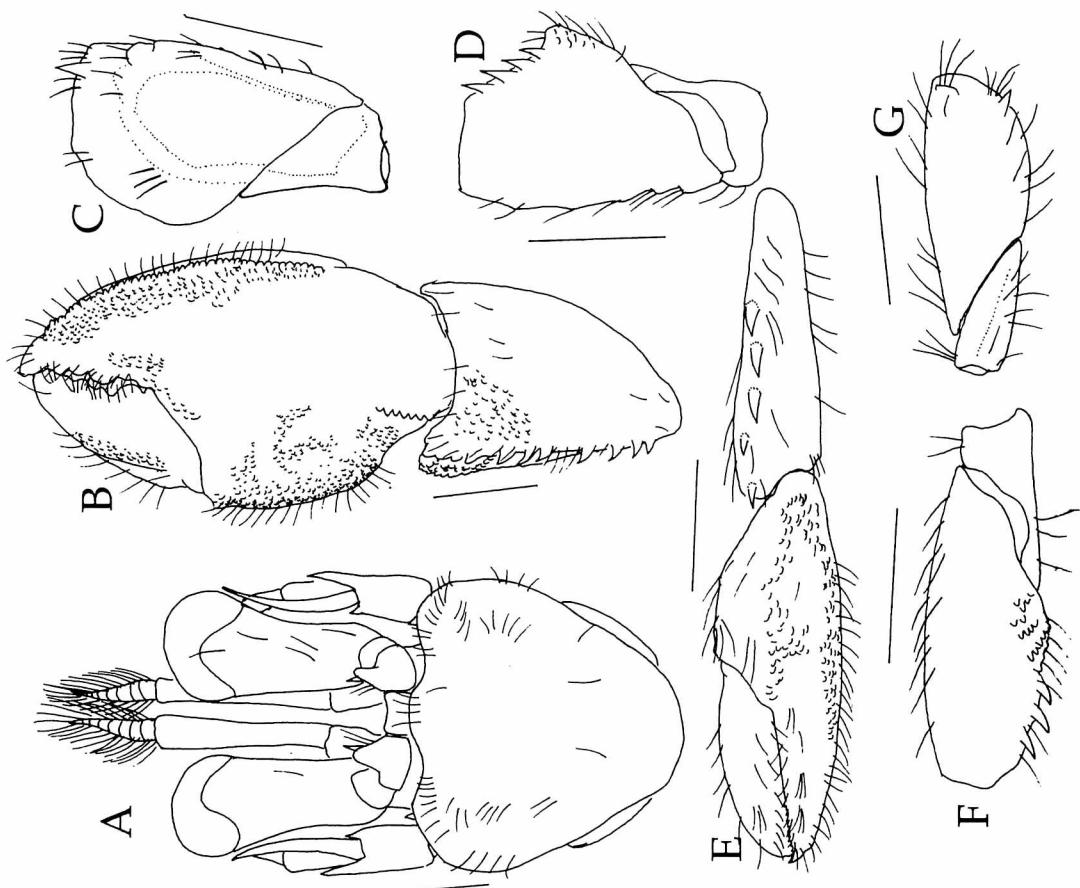


Fig. 66. *Anapagurus japonicus* Ortmann, 1892: A, E-G, ♂, SL = 2.00 mm, Tsuyazaki, Fukuo-ken, ZLKU (KMNH) 9214-9288; B-D, ♂, SL = 1.85 mm, same lot. A, shield and cephalic appendages, dorsal; B, chela and carpus of right cheliped, dorsal; C, merus and ischium of right cheliped, mesial; D, same, lateral; E, chela and carpus of left cheliped, dorsal; F, merus and ischium of left cheliped, lateral; G, same, mesial. Scales equal 1 mm.

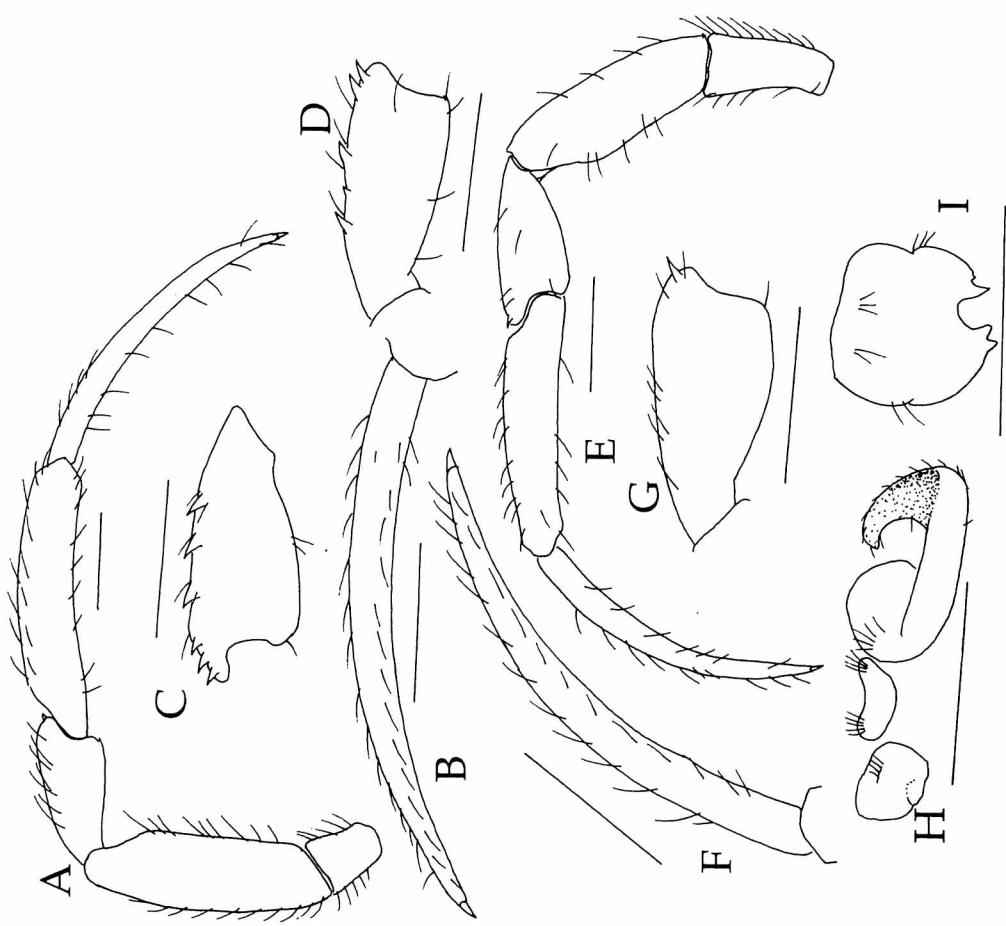


Fig. 67. *Anapagurus japonicus* Ortmann, 1892: A-G, ♂, SL = 2.00 mm, Tsuyazaki, Fukuo-ken, ZLKU (KMNH) 9214-9288; H, ♂, SL = 1.85 mm, same lot. A, right second pereopod, lateral; B, same, dactyl and distal margin of propodus, mesial; C, carpus, mesial; D, left second pereopod, carpus, mesial; E, left third pereopod, lateral; F, dactyl and distal margin of propodus, mesial; G, same, carpus, mesial; H, sternite and coxae of fifth pereopod, ventral; I, telson, dorsal. Scales equal 1 mm.

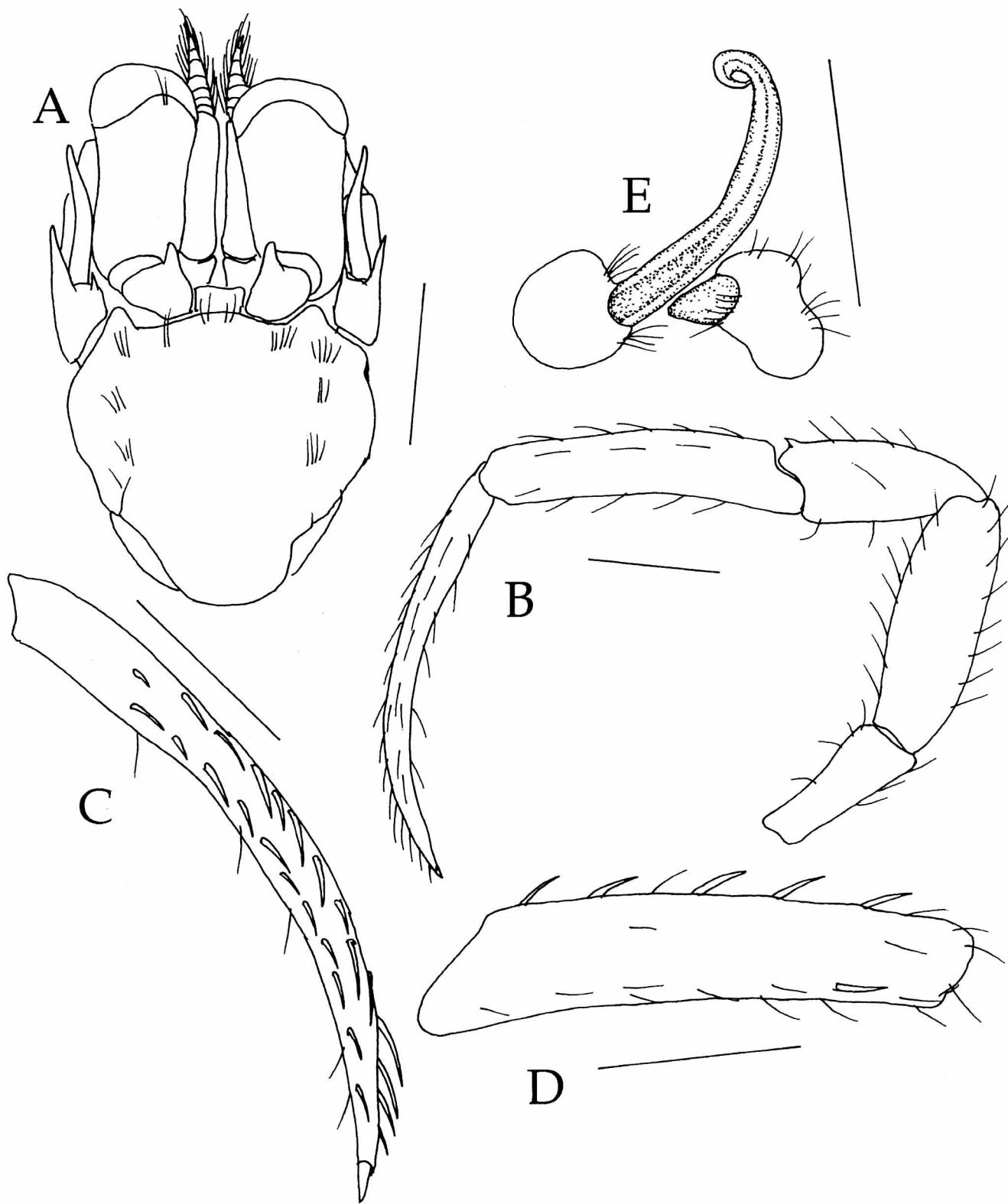


Fig. 68. *Nematopagurus tricarinatus* (Stimpson, 1858): ♂, SL = 1.85 mm, Tsuyazaki, Fukuoka-ken, ZLNU (KMNH) 9294. A, shield and cephalic appendages, dorsal; B, left third pereopod, lateral; C, same, dactyl, mesial; D, same, propodus, mesial; E, coxae of fifth pereopods, ventral. Scales equal 1 mm.

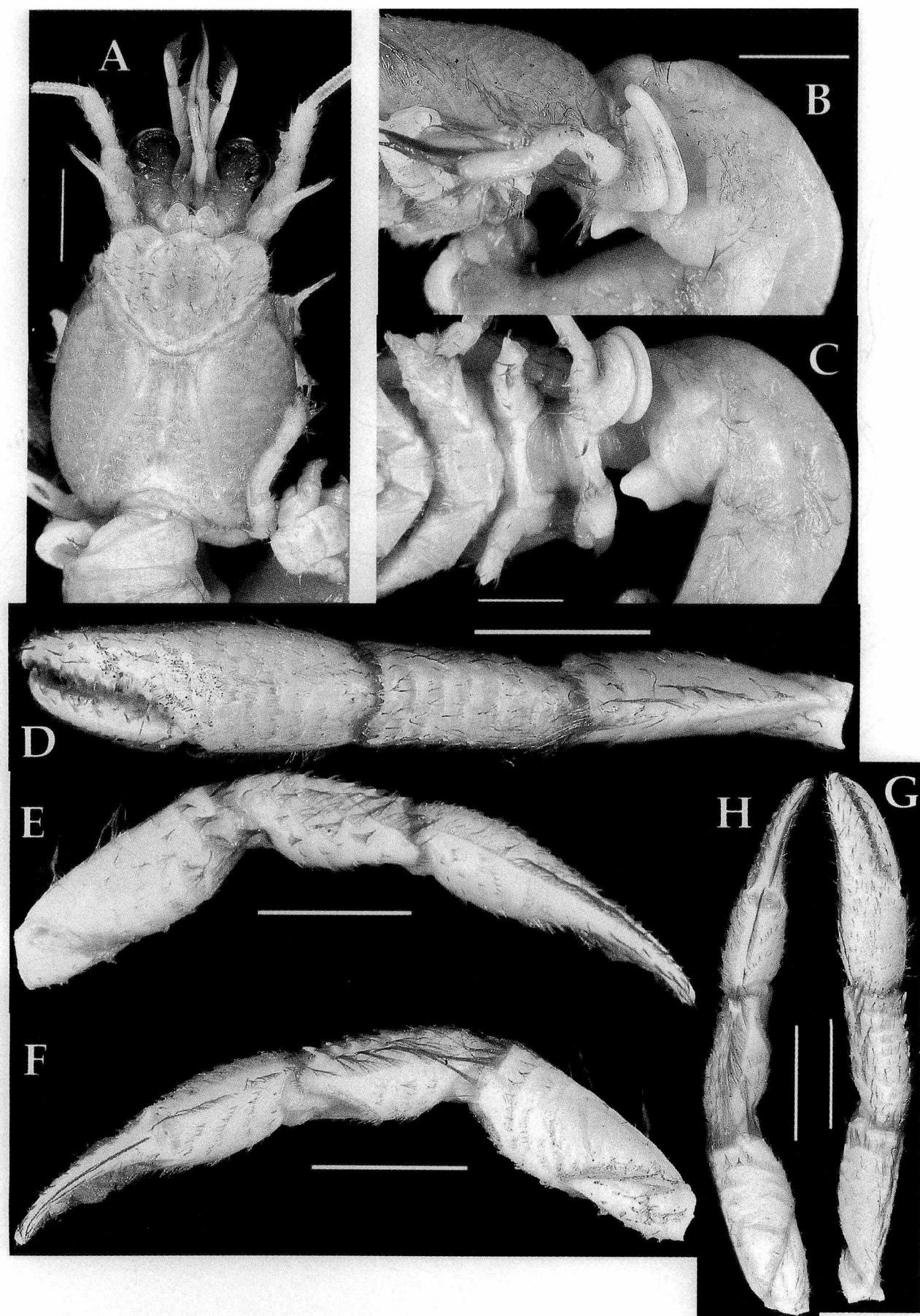


Fig. 69. *Spiropagurus spiriger* Ortmann, 1892: ♂, SL = 6.50 mm Toyama-shi, Toyama-ken, TOYA Z90-21-a. A, carapace and cephalic appendages, dorsal; B, lateral side of body (partial) showing sexual tube; C, ventral side of body (partial) showing sexual tube; D, right cheliped, dorsal; E, same, lateral; F, same, mesial; G, left cheliped, dorsal; H, same, mesial. Scales equal 5 mm.

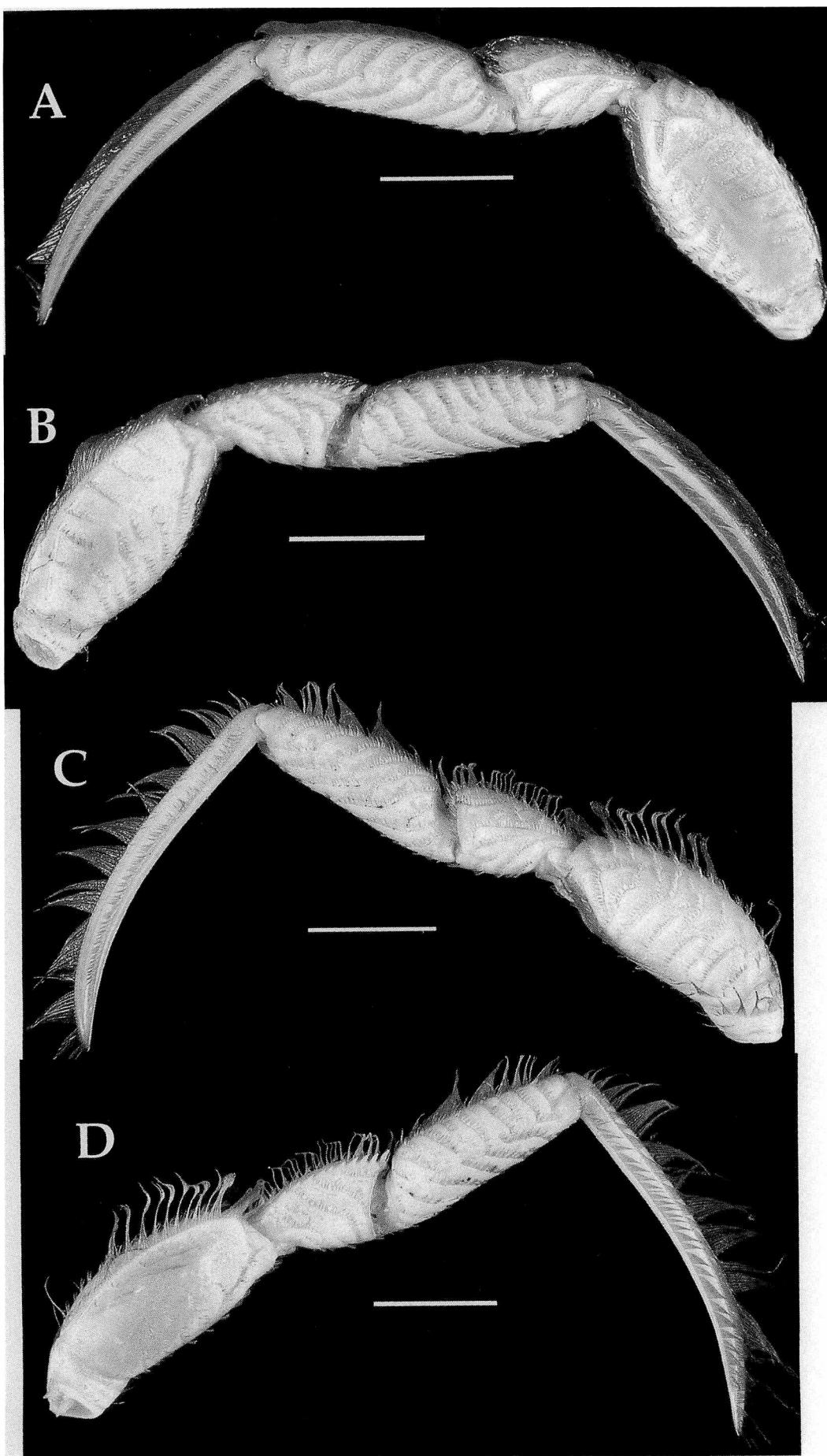


Fig. 70. *Spiropagurus spiriger* Ortmann, 1892: ♂, SL = 6.50 mm Toyama-shi, Toyama-ken, TOYA Z90-21-a. A, left second pereopod, lateral; B, same, mesial; C, left third pereopod, lateral; D, same, mesial. Scales equal 5 mm.